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VOLUME IV *May, 1956* NUMBER 5

HAEMATEMESIS IN THE ELDERLY

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INTRODUCTION

Haematemesis is one of the common medical emergencies which may threaten a patient's life. In most civilised countries it is steadily increasing in frequency. Improved social conditions and medical advances have brought about profound changes in the age structure of civilised communities, which are becoming increasingly composed of people over the age of 50. This older section of the population is more liable than the younger to suffer from peptic ulcer and carcinoma of the stomach, which between them account for 9 out of every 10 cases of severe haematemesis in Great Britain. As age advances, haematemesis becomes a progressively more dangerous condition.

We imply by haematemesis the vomiting of sufficient blood to cause "shock" followed by a rapidly falling haemoglobin level of the blood. Minor degrees of the condition are not infrequent, but we have not concerned ourselves with them, as they do not directly threaten life. Nevertheless it need hardly be said that any case, however mild, must be fully investigated. Although we have used the term haematemesis in our title, we include in this discussion cases of severe melaena not accompanied by haematemesis. When dark tarry blood is passed per rectum, it almost always comes from high in the gastro-intestinal tract, and its causes are for practical purposes the same as those of haematemesis. Severe bleeding per rectum may arise from lesions low in the alimentary tract, such as carcinoma of the colon or rectum, ulcerative colitis, regional ileitis, hereditary telangiectasia, the haemorrhagic blood disorders and, perhaps not sufficiently recognised as a common cause, diverticulitis (1). However, bleeding from these causes usually gives rise to the passage of bright red or only slightly altered blood, so that confusion seldom arises.

SOURCES OF DATA

The results presented in this article and the views expressed are mainly based on an analysis we have made (2) of the experience of the Radcliffe Infirmary, Oxford, for the period 1948–52, which we have compared with a similar analysis

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TABLE 1

Higher Proportions of Elderly Patients Were Admitted During the Later Period

Age Group	1938–1947		1948–1952	
	No. of patients	% of total series	No. of patients	% of total series
Under 30	26	8.5	30	5.6
30–39	42	13.8	45	8.3
40–49	67	22.0	99	18.3
50–59	84	27.5	137	25.4
60–69	56	18.4	141	26.1
Over 70	30	9.8	88	16.3
Totals	*305*	*100.0*	*540*	*100.0*

(3) made for the previous decade, 1938–47. The Radcliffe Infirmary provides an excellent opportunity for studying this problem, for it is the only general hospital taking in emergencies from the City of Oxford and a considerable rural district surrounding it. As it is the main teaching hospital of the University of Oxford, the standard of care is high and the medical records are full. The population is relatively stable and the hospital serves much the same area as it did twenty years ago. Emergency patients of all social classes are admitted as a matter of course, as large private hospitals dealing with emergencies do not exist. In order to demonstrate how important haematemesis is to the geriatrician we have re-analysed some of our data to bring out those special features relevant to the elderly patient.

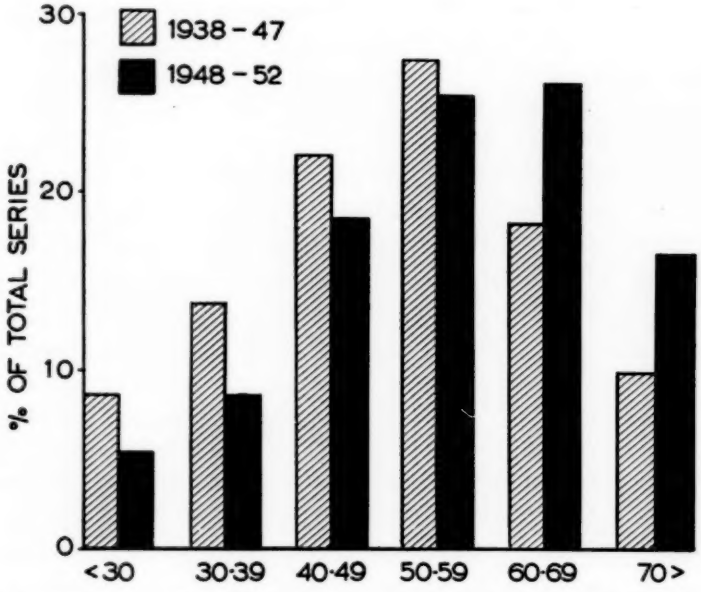

FIG. 1. The percentage of admissions in the older age groups was markedly increased in the later series.

INCREASING FREQUENCY OF HAEMATEMESIS

During the decade 1938–47, there were 305 cases of haematemesis admitted to the hospital. During the succeeding *five* years, 1948–52, there were 540 such cases. Within this second period, there was a general upward trend in the rate of admission for haematemesis, there being 87 patients admitted in 1948 compared with 142 in 1952.

INCREASING PROPORTIONS OF OLDER PATIENTS

Not only were increased numbers of patients admitted during the later period under review, but there was a higher proportion of the older age-groups. The full

TABLE 2

Causes of Haematemesis During the Period of 1948–1952 in Two Main Age-groups

	Under 60 Age-group		Over 60 Age-group		Total Series	
	No. of admissions	%	No. of admissions	%	No. of admissions	%
Chronic peptic ulcer	229	73.6	148	64.6	377	69.8
Acute peptic ulcer	46	14.8	38	16.6	84	15.6
Carcinoma of stomach	7	2.3	13	5.7	20	3.7
Oesophageal varices	13	4.2	10	4.4	23	4.3
Other known causes	2	0.6	8	3.5	10	1.9
Unknown	14	4.5	12	5.2	26	4.8
Totals	*311*	*100.0*	*229*	*100.0*	*540*	*100.0*

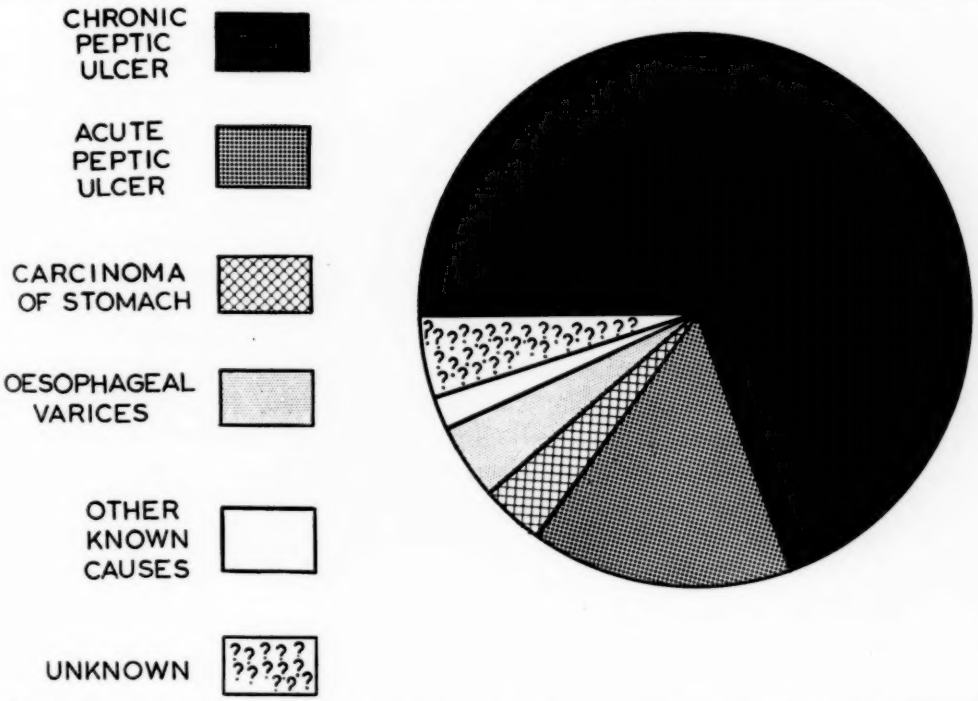

FIG. 2. Showing the frequency of various causes of haematemesis during the period 1948–52.

details are set out in Table 1 and Figure 1. It is particularly worth mentioning that patients aged more than 60 made up no less than 42.4 per cent of the later series, compared with 28.2 per cent of the earlier. The absolute numbers show an even more striking increase, there having been 86 patients over the age of 60 admitted during the first ten years compared with 229 during the following five years. Thus, these elderly patients are now being admitted at five times the rate they used to be.

FREQUENCY OF PEPTIC ULCER AS A CAUSE

Peptic ulcer is by far the most common cause of serious haematemesis (Table 2, Fig. 2). About 7 out of every 10 patients in each of our two series had good evidence of a chronic ulcer. This was roughly true at all age levels. Next in frequency was the acute peptic ulcer, which accounted for a further 1 in every 6 patients in each of the series. Thus peptic ulcer as a whole accounted for about 17 out of every 20 admissions. The only other single causes which contributed any considerable numbers of admissions were oesophageal varices due to portal hypertension, and carcinoma of the stomach. The cases of portal hypertension were diagnosed with reasonable certainty because they were almost all known to be examples of hepatic cirrhosis before haematemesis developed, and splenomegaly was almost invariable. Haematemesis at some stage is a fairly frequent symptom in carcinoma of the stomach (4), and a major haemorrhage sufficient to cause emergency admission is not rare, there being 20 such cases in our second series, accounting for 1 in every 27 admissions. Carcinoma of the stomach commonly occurs in elderly patients, and in them the possibility of this being the underlying lesion should always be kept in mind. For example, among the patients aged over 60 it accounted for 1 in every 18 admissions. This point is worth emphasising because no less a surgeon than Finsterer has said that "Carcinoma seldom leads to severe bleeding" (5). The symptoms preceding the haematemesis may be identical with those of peptic ulcer—either acute or chronic—but no harm results if the patient is treated for his haematemesis on the same lines as if he were an ulcer subject, with the proviso that every case of haematemesis must be fully investigated as soon as the patient is sufficiently recovered, usually in about three weeks.

In our series other causes were diverse but uncommon, and included hereditary telangiectasia and hiatus hernia. In a fair number of patients no diagnosis could be made at the time of admission. Among these, the only diagnosis made later was that of peptic ulcer in about one-third of them. In the other two-thirds, investigation revealed no cause for the haematemesis, which nevertheless may have been due to peptic ulceration. When the diagnosis is unknown, one is fairly safe in treating the patient as though he had a peptic ulcer.

EFFECT OF SEX

Haematemesis is more than twice as common in men as in women, which is a reflection of the greater liability of men to suffer from peptic ulcer. The difference between the sexes is much less marked in the elderly than would appear from

TABLE 3

Numbers of Men and Women with Haematemesis in Various Age-groups (Chronic Ulcer Group, 1948–1952 Series)

	Age Less Than 50	Age 50–59	Age 60 and Over	Totals
Men	107 (79.3%)	59 (62.8%)	96 (64.9%)	262
Women	28 (20.7%)	35 (37.2%)	52 (35.1%)	115
Totals	*135 (100.0%)*	*94 (100.0%)*	*148 (100.0%)*	*377*
Male/female ratio	3.8:1	1.7:1	1.8:1	

this general statement. This is because women are liable to have chronic peptic ulcers after the menopause, although they are relatively free from them earlier (6). If we limit ourselves to patients in our 1948–52 series with evidence of chronic peptic ulcer, we see from Table 3 that below the age of 50, there were almost 4 men with haematemesis for every woman. Above the age of 50, the male:female ratio fell to 1.8:1. The general principles of diagnosis and treatment apply equally to both sexes.

RECURRENT BLEEDING

A considerable number of patients continue to bleed after admission or, having temporarily responded to medical treatment, suffer a further sharp haemorrhage. One in every 3 of the Oxford patients with chronic peptic ulcer behaved in this way. It is an interesting and important fact that we have been unable to discover any factors among the chronic ulcer group which will indicate greater than average risk of recurrent bleeding. Neither age nor history of a previous haematemesis have any marked influence. It is sometimes assumed that the longer an ulcer

TABLE 4

*Incidence of Recurrent Bleeding in Two Main Age-groups (Chronic Ulcer Group)**

Age Group	No. of Patients	No. with Recurrent Bleeding
Under 50	135	41 (30.4%)
Over 50	229	80 (34.9%)

* This table and tables 5, 7, 8 and 9 are reproduced by permission of the *British Medical Journal* from Fraenkel and Truelove (2).

TABLE 5

Incidence of Recurrent Bleeding in Patients With and Without a History of Previous Haematemesis (Chronic Ulcer Group)

	No. of Patients	No. with Recurrent Bleeding
With previous bleeding	108	37 (34.2%)
No previous bleeding	256	84 (32.8%)

TABLE 6

Liability to Recurrent Bleeding in Relation to Length of Ulcer History (Chronic Ulcer Group, 1948–1952)

Length of Ulcer History	No. of Patients	No. with Recurrent Bleeding
Less than 5 years	101	35 (34.7%)
More than 10 years	207	67 (32.4%)

has existed, the more likely it is to give rise to recurrent bleeding, but our figures do not support this view (Tables 4, 5, 6).

FATALITY RATES

The outstanding single factor which influences the outcome in severe haematemesis is the age of the patient. If the bleeding continues or recurs, patients who are over the age of 50 years are unduly liable to die. We have already shown that

TABLE 7

Fatality Rate from Haematemesis by Age (Total Series)

Age Group	1938–1947			1948–1952		
	No. of cases	Deaths	Fatality rate	No. of cases	Deaths	Fatality rate
			%			%
Under 30	26	0	0	30	0	0
30–39	42	3	7.1	45	1	2.2
40–49	67	5	7.5	99	2	2.0
50–59	84	19	22.6	137	16	11.7
60–69	56	18	32.1	141	12	8.5
Over 70	30	13	43.3	88	14	15.9
Totals	*305*	*58*	*19.0*	*540*	*45*	*8.3*

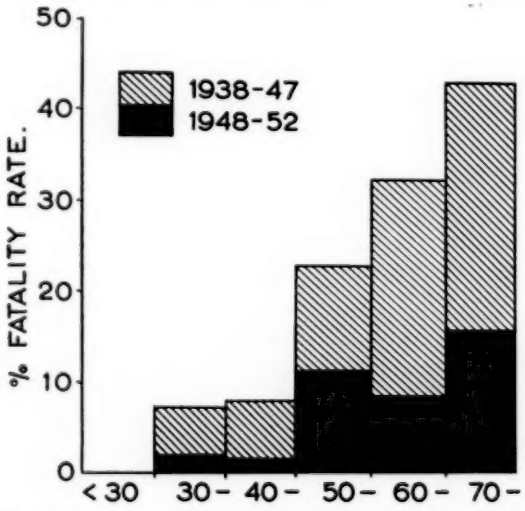

FIG. 3. Whole series. Fatality rate by age groups. (Figs. 3 and 4 are re-drawn, with permission of the *British Medical Journal*, from Fraenkel and Truelove (2).)

TABLE 8

Fatality Rate from Haematemesis by Age (Chronic Ulcer Groups)

Age Group	1938–1947			1948–1952		
	No. of cases	Deaths	Fatality rate	No. of cases	Deaths	Fatality rate
			%			%
Under 30	18	0	0	17	0	0
30–39	30	2	6.6	35	0	0
40–49	44	4	9.1	83	0	0
50–59	59	15	25.4	94	8	8.5
60–69	41	13	31.7	88	5	5.7
Over 70	16	5	31.2	60	8	13.3
Totals.....	*208*	*39*	*18.8*	*377*	*21*	*5.6*

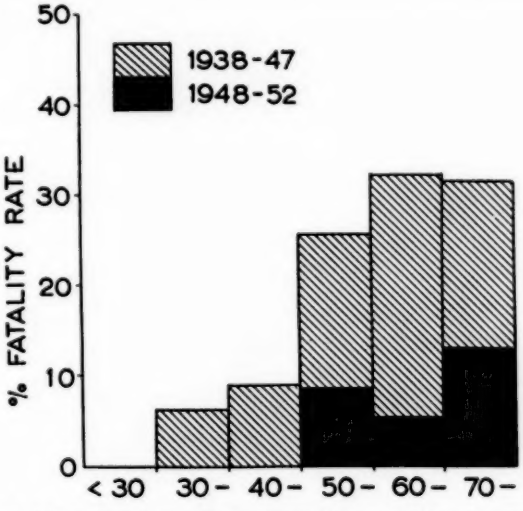

FIG. 4. Chronic ulcer group. Fatality rate by age groups.

they do not experience recurrent bleeding more frequently than younger patients, but they do not survive it so well when it does occur.

Table 7 and Figure 3, which list the fatality rates for all patients with haematemesis during the two periods 1938–47 and 1948–52, demonstrate that in the earlier and the later series there was a sharp increase in the fatality rates over the age of 50.

A similar picture emerges if we present the results only for the chronic ulcer group, which is the largest and most homogeneous single group. The fatality rate for this group fell from 18.8 per cent in the earlier series to 5.6 per cent in the later. Table 8 and Figure 4 show that the improvement took place at all age levels. They also show convincingly the steep increase of the fatality rate above the age of 50. Indeed during the period 1948–52 there were no deaths among 135 patients with a chronic ulcer under the age of 50, whereas there were 21 deaths among 242 patients over that age.

Another point of great importance emerges from these tables and figures. It

will be seen that the fatality rate was high during the earlier period 1938–47 and dropped considerably during the later period 1948–52. This lower fatality rate occurred in spite of the fact that the later series contained the larger proportion of elderly patients, as shown in Table 1 and Figure 1. It might therefore be expected that haematemesis would have been more dangerous in the second series. We believe that several factors have combined to produce the opposite result. The first series (1938–47) embraced the period of World War II and the staff of the hospital was heavily depleted thereby. The creation of blood banks backed by a National Blood Transfusion Service took place during the period under review, and made blood transfusion much more readily available at great speed. Penicillin and the more recent antibiotics are valuable in checking complications such as pneumonia. However, we believe that a major factor involved in the improvement has been the much more ready resort to emergency surgery.

During the period 1938–47 it was customary to treat the patients by accepted medical measures, including blood transfusion, and to call in the surgeon only in desperate cases. The results of surgery in this setting were far from good. During 1948–52, on the other hand, 1 in 6 of the patients with peptic ulcer was treated by emergency partial gastrectomy. Among the 76 patients submitted to emergency operation there were 7 deaths (9.2 per cent). None of these occurred in the 20 patients who were aged less than 50 years. Hence there were 7 deaths (12.5 per cent) among the 56 patients over 50 years old. The operative fatality among patients over 50 was therefore considerable, but we must remember that the patients selected for emergency operation were those who would have had a high fatality rate with medical treatment, almost certainly much higher than occurred with surgery.

Of the 76 emergency operations, 66 were performed on patients in the chronic ulcer group, with 6 deaths (9.1 per cent). The remaining 10 emergency operations were carried out for acute ulcer, and there was 1 death. Thus there is no obvious difference between the results of surgery in the acute and chronic ulcer groups.

It has already been noted that 20 of the emergency operations were carried out on patients under the age of 50. At the other end of the age scale, 14 emergency operations were performed on patients over the age of 70, with 2 deaths—a fatality rate not appreciably different from the group between 50 and 70, as will be seen from Table 9. The good results of emergency surgery among the oldest age-group are worth special mention. In Britain, at any rate, there are many physicians who are reluctant to resort to emergency surgery in patients aged more than 70, but this attitude appears to be due to a pre-conceived idea that the old do not survive major surgery. This view is not borne out by practical experience.

TABLE 9

Operative Fatality Rate in Relation to Age

Age Group	No. of Cases	No. of Deaths
Under 50	20	0
50–69	41	5 (12.2%)
Over 70	15	2 (13.3%)

INEVITABLE DEATHS

It may be thought that the results, even for the second series, are not particularly good, because it has sometimes been said that haematemesis does not often directly threaten life (7, 8, 9). We therefore wish to make the following two observations:

(a) The present results refer only to patients in whom there was evidence of considerable haemorrhage, and trivial cases have been excluded.

(b) *All* cases of severe haematemesis were included, even if some other grave disease existed in addition to the haematemesis, sometimes making death inevitable.

In connection with this second point we present brief details of the cases we have classified as "inevitable deaths." Among the 21 patients with chronic peptic ulcer who died, there were 11 such cases. If these had been excluded, as is commonly done, the fatality rate in our chronic ulcer group would be 2.7 per cent which compares very favourably with contemporary British series (10).

Inevitable deaths. In some of these patients, massive bleeding was found only at necropsy. The nature of their complicating illnesses was as follows:

1. A man aged 56 was admitted with coronary thrombosis. Arterial embolism of the leg necessitated amputation and re-amputation. He collapsed and died suddenly. At necropsy, massive bleeding from a large benign gastric ulcer was found.

2. A man aged 59 was admitted with acute appendicitis and general peritonitis. Severe recurrent haematemesis developed, but the patient was too ill for operation.

3. A man aged 59 was admitted with haematemesis from chronic duodenal ulcer. He also suffered from severe chronic tuberculous empyema with multiple sinuses and destruction of the right lung.

4. A woman aged 57, who had severe chronic bronchitis, was admitted with bronchopneumonia and cardiac failure. Massive haematemesis developed from a duodenal ulcer.

5. A man aged 65 was admitted with carcinoma of the gallbladder and multiple metastases. He died suddenly. Necropsy showed two gastric ulcers and a duodenal ulcer with a large amount of fresh blood in the stomach and small intestine.

6. A man aged 68 had previously undergone removal of a carcinoma of rectum with local metastases. He had been ill at home with carcinomatosis until admitted moribund. He died in three hours. Necropsy showed inhaled vomitus, gross pyloric stenosis, and a duodenal ulcer which had bled.

7. A man aged 70 was admitted for prostatectomy. On the twelfth day he had massive haematemesis and died in three hours in spite of transfusion. Necropsy showed a large gastric ulcer which had eroded an artery.

8. A man aged 75 was admitted with obstructive jaundice due to gallstones. He had suffered from intermittent attacks of jaundice with rigors for four years. Haematemesis developed and he quickly died. Necropsy showed two duodenal ulcers with fresh blood in intestine, cholelithiasis, and fibrosis of liver.

9. A man aged 75 was admitted in coma due to metastases from a carcinoma of the prostate which had been previously removed. There was recurrent haematemesis and he died in four days. Necropsy showed bleeding chronic gastric ulcer and lobar pneumonia in addition to carcinomatosis.

10. A man aged 81 had a six-year history of hypertensive cardiac failure with auricular fibrillation. He was admitted with haematemesis and heart failure. He had recurrent haematemeses and died on eleventh day. Necropsy showed two large chronic gastric ulcers, one of which had eroded an artery, and an enormous heart with generalized atheroma.

11. A woman aged 71 was admitted with acute intestinal obstruction due to carcinoma

of the ascending colon. Following a hemi-colectomy, she had severe recurrent haematemeses and died. Necropsy showed four chronic gastric ulcers.

PRINCIPLES OF TREATMENT

Any patient who suffers from a severe haematemesis or melaena should be admitted to a hospital without delay. In general, we think it best that he should be in the care of an internist, but a surgeon should be in touch with the case from the beginning.

A brief history—if necessary, from relatives—will commonly yield useful information about previous dyspepsia and other important aspects such as the cardiac reserve. If the patient is severely shocked, clinical examination should be restricted to two main facets:

(a) Estimation of severity of shock, as judged by the general appearance of the patient and the rate and volume of the pulse and blood pressure.

(b) Evidence of diseases other than peptic ulcer which might be the cause of the haematemesis, such as spider naevi, enlargment of the spleen, or purpura.

Laboratory investigation at this stage should be confined to ascertaining the blood group and estimating the haemoglobin level; the latter will not be low after an episode of major bleeding if the estimation is made promptly, because it takes up to twenty-four hours for the blood to become diluted and return to its original volume. The decision as to whether immediate blood transfusion is necessary can confidently be made on clinical grounds only. If the patient is in a state of shock due to bleeding, the essential point in treatment is to correct the loss of blood as expeditiously as possible. Delay is particularly dangerous in patients over the age of 50, because in them the cardiovascular system will not adjust efficiently to a suddenly reduced blood volume, and they die if this reduction is not corrected quickly. In addition to blood transfusion, they should have ample fluid by mouth to facilitate an adequate output of urine. A light but nourishing diet should be given as soon as the patient feels capable of taking it. If the patient is apprehensive, sedatives are valuable; on the whole we prefer not to use morphia, because it frequently causes nausea and vomiting. Most patients will make an uneventful recovery with this treatment. However, about 30 per cent either continue to bleed steadily—as shown by their failure to come out of a state of shock with the foregoing measures—or, after responding, have a sharp recurrent haemorrhage with a deterioration of general condition, fall in blood pressure, rise in pulse rate and often frank haematemesis. If this should be the course of events in a patient aged more than 50, he should be treated by emergency surgery unless there are special contraindications. Experience has shown that the same urgency does not apply to a younger person.

THE SCOPE OF EMERGENCY SURGERY

It has been usual in the Radcliffe Infirmary for all patients to be admitted under the care of an internist and to begin treatment with general medical measures as previously outlined, blood transfusion being the most important

single step. On this regimen, it was found that 7 out of every 10 patients with peptic ulcer made an uneventful recovery from the haematemesis. The remaining 3 suffered from further bleeding. During the first period (1938–47), it was usual to persist in medical treatment and surgery was resorted to in only a few desperate cases. In these circumstances, surgical results were bad. During the later series (1948–52), the general pattern has been to carry out emergency partial gastrectomy on all such patients if they were aged over 50, unless serious complicating disease prohibited this course of action. In patients below the age of 50, emergency partial gastrectomy was carried out less often and usually only when the bleeding was very severe. Other operations for the arrest of bleeding are generally unsatisfactory and partial gastrectomy was the sole procedure used in the second series.

We define as an emergency partial gastrectomy in this context an operation which is carried out for the immediate arrest of dangerous haemorrhage. We have not included partial gastrectomy performed when the patient has shown no evidence of active bleeding for twenty-four hours or more. An emergency partial gastrectomy, as we have defined it, is a procedure calling for speed in decision and in execution. Once the criteria demanding surgery have been satisfied, the operation should proceed with the greatest possible urgency. The patient should be taken forthwith to the theatre with blood transfusion in progress. If he is badly shocked, resort to intra-arterial transfusion will make him fit for operation within a few minutes.

The anaesthetic is of great importance. Perfect relaxation is an essential if the surgeon is to work fast. But the use of relaxants carries the risks of apnoea and of regurgitation of stomach contents and calls for great experience on the part of the anaesthetist. The services of a specialist anaesthetist are invaluable.

A midline incision is the speediest and most convenient. A chronic gastric ulcer is usually obvious. In the duodenum, a bleeding ulcer is usually posterior and penetrating and may extend well into the second part. In both cases the procedure differs from an elective gastrectomy in that the first step is to expose the floor of the ulcer as rapidly as possible and to arrest the bleeding. This is of great importance in posterior, penetrating duodenal ulcers because the dissection of the duodenum may occupy as much as twenty minutes and the patient should not be allowed to bleed for so long. The condition of the patient usually improves steadily once bleeding is arrested, and permits the operation to be completed without undue haste. The resection should be carried out as carefully as in an elective operation, but this is not to say that the surgeon should tarry, and these operations are usually completed in just over an hour for a gastric ulcer and in under two hours for a duodenal ulcer. A partial gastrectomy for a bleeding ulcer must include the ulcer in the resection. Unexpected technical difficulties sometimes arise—such as those created by the finding of a very high gastric ulcer close to the oesophagus—but the experienced surgeon can usually deal with them without too much loss of time. In elderly malnourished patients, giant gastric ulcers are not infrequent, and may be mistaken for carcinomata. Surprisingly enough, they are easily dealt with. If the edge of the ulcer is separated from its bed—

usually eroded pancreas—the bleeding is easily arrested and the completion of the gastrectomy presents no difficulty.

A more difficult situation faces the surgeon when no ulcer is obvious on first examination of the stomach and duodenum. Quick inspection of the liver and spleen will exclude portal hypertension, though this condition was correctly diagnosed in all cases on admission in our series. Next, the lesser sac is opened and the posterior walls of the stomach and duodenum are searched, particularly along the attachment of the lesser omentum. If an ulcer is still not found, the stomach is opened and the mucosa carefully examined for bleeding vessels. Acute ulcers may be very small and yet give rise to massive bleeding. In all these cases partial gastrectomy is carried out, with the resection including the bleeding vessel. Sometimes only haemorrhagic gastritis is found; nevertheless, a high partial gastrectomy is performed, and this usually checks the bleeding.

Following the operation, particular attention should be given to the blood pressure. If hypotension occurs, it should be corrected by further blood transfusion or some appropriate plasma volume expander, such as dextran. Otherwise, the patients are treated along routine lines and should be ready for discharge from the hospital in about ten days.

It is worth mentioning that haemorrhage from oesophageal varices demands special treatment. In addition to the general medical measures previously outlined, occlusion of the varices by inflatable oesophageal tubes, such as the Sengstaken tube, is usually first tried. If this fails, various methods of surgical treatment have been used, such as immediate porta-caval shunt, transection of the stomach, excision of the veins, or total gastrectomy (11). At the Radcliffe Infirmary considerable success has been obtained by injecting sclerosing solutions into the offending varices through an oesophagoscope (12).

DISCUSSION

In Oxford severe haematemesis is an extremely common cause for emergency admission to the hospital and it is interesting to consider why it has assumed such a prominent place. We confine our remarks to what has been taking place in Britain alone, though comparable changes have doubtless occurred in other countries.

At the beginning of this century haematemesis occurred most commonly among young women suffering from acute gastric erosions. It was mild in character and the victims survived the accepted treatment of starvation and rest (13). During the period between the two World Wars, chronic peptic ulcer became steadily more common (14, 15). It was an unusual cause for invaliding out of the Armed Forces in the 1914–18 war, whereas it was one of the most frequent causes during the 1939–45 war.

With chronic peptic ulcer, when bleeding occurs it is often due to erosion of a large artery, so that haemorrhage is massive. During the 1930's, three advances in the medical treatment of haematemesis occurred under the impact of the more severe type of bleeding observed. A regimen of giving ample fluids and food by mouth was developed by Meulengracht in Denmark and found favour in Britain

(16, 17). Blood transfusion became widely used after Marriott and Kekwick (18) introduced the drip method of administration. Surgery began to make sporadic inroads into what had previously been an internist's prerogative. Under the influence of the Viennese surgeon, Finsterer (5, 19), Gordon-Taylor (20–22) strongly advocated emergency surgery within the first forty-eight hours if the bleeding was severe and there was a history of peptic ulcer. However, surgery did not come into general use until after the 1939–45 war. In 1947, Avery Jones (23) presented the results of several years' personal study of the problem and demonstrated that patients over the age of 50 who suffered from continued or recurrent bleeding after admission to the hospital were exceptionally prone to die. As a corollary, he showed that although emergency surgery for this condition carried an appreciable fatality rate, this was much lower than the risk borne by the selected group of patients previously mentioned if they were left under medical treatment. Since that time, selective surgery along these lines has become widely adopted in Britain, and our second series (1948–52) is an example. Some enthusiastic surgeons have operated immediately on all patients with haematemesis who have a history suggestive of chronic peptic ulcer, but the results are no better than those obtained by selective surgery (24–26).

Thus we find that haematemesis has become a more severe condition than it was previously, because of the increasing frequency of chronic peptic ulcer and the large numbers of the population over the age of 50 who suffer from this condition. One of the oldest functions of surgery has been to arrest haemorrhage. It is therefore logical to make use of emergency surgery in patients with severe haematemesis who are not responding swiftly to medical treatment. Patients who are middle-aged or elderly tolerate prolonged bleeding badly and it is for this reason that emergency surgery finds its largest scope in the older age-groups.

SUMMARY

1. Haematemesis is a common and dangerous medical emergency in Britain. It is common because of the great frequency of peptic ulcer in the population. It is dangerous because large numbers of peptic ulcer subjects are over the age of 50 and increasing age has a bad prognostic significance.

2. The experience of the Radcliffe Infirmary, Oxford, during a recent five-year period has been compared with that during the preceding decade.

3. Increasing numbers of elderly patients are now entering the hospital because of severe haematemesis. During 1948–52, no less than 42.4 per cent of the patients were over the age of 60.

4. Peptic ulcers were the cause of the bleeding in the large majority of patients.

5. Under general medical treatment, including blood transfusion as an important element, about 7 out of 10 ulcer patients made an uneventful recovery. The remaining 3 in every 10 suffered from continued or recurrent haemorrhage after admission to the hospital.

6. In such cases, emergency surgery is being widely used, particularly in patients over the age of 50.

Acknowledgments

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OSTEOPOROSIS: DIAGNOSIS AND TREATMENT*

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Osteoporosis is a general disease of bone in which the protein matrix is not normally maintained but is lost, the mineral salts deposited in the organic framework are progressively dissipated, and the bone becomes structurally weak and likely to fail under load. It affects all bones, although the familiar changes, such as radiolucency and symptomatic fractures, are most obvious in the vertebral bodies, so that it is misapprehended as a disease of the vertebrae chiefly or alone. It is primarily an endocrine disturbance, to judge from all evidence thus far, being probably part of a widespread disorder of protein synthesis in which the loss of mineral is only an incidental feature that attracts clinical attention and the loss even of bone matrix is but a single aspect. The basic abnormality is amenable to correction by hormonal therapy at present available.

There is a distinct disease called osteomalacia that seems superficially to be similar to osteoporosis, in that by roentgenogram the skeleton shows loss of mineral. However, in osteomalacia the disturbance lies entirely in mineral metabolism, though it can be brought about in several ways; the soft-tissue matrix of bone is not involved, as it is in osteoporosis. Osteomalacia occurs in malnutrition with a deficient uptake of calcium and/or sunshine and/or vitamin D, *i.e.*, it is an adult counterpart of rickets. It occurs in chronic renal insufficiency with loss of calcium through acidosis, in steatorrhea with loss of calcium via the stool, in resistance to the action of vitamin D, in Milkman's syndrome, and in aminoaciduria or Fanconi's syndrome—and doubtless other examples. In all these the demineralization is a primary event with respect to bone. There is a more or less intact protein matrix which could be recalcified if calcium and vitamin D were given. Osteoporosis is a disturbance primarily of the matrix, and the loss of mineral is incidental. It is important to distinguish these two conditions, because little is accomplished in osteoporosis by giving calcium. Osteoporosis, again, is a disease in which there is not formed a protein matrix in which to deposit calcium. (To those already familiar with this distinction, the emphasis may be tedious; but it has proved to be necessary.)

VARIETIES OF OSTEOPOROSIS

Osteoporosis may be physiologic, or it may be the result of adrenal disturbances, postmenopausal and geriatric changes, hyperthyroidism, or unknown causes.

Physiologic osteoporosis depends on the fact that bone, like all living tissues, constantly undergoes an active chemical exchange or turnover of all its constitu-

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ents, and maintains only those portions of its structure that are actively at work. A patient who is put to bed immediately begins to lose matrix and mineral from the skeleton. If one leg is placed in a cast, the bones of that leg rapidly lose substance, exactly as do the muscles, and there develops a marked difference from the other leg, even though neither is bearing weight. (The reason people toss and turn in bed is so that the skeleton will still be there in the morning.) Every tissue is responsive to the peculiar demands placed on it, and bone is highly responsive to mechanical stress, or loading.

The effect of mechanical stress upon bone is a central fact in the prevention and management of osteoporosis. (Unfortunately "stress" has acquired some mysterious significance in recent times, so that it may be well to explain exactly what is intended by it.) *Stress* is the force applied per unit area of cross-section of any mechanical member, and *strain* is the deformation of that member under a given stress. Bone, like other structural materials, is elastic: the strain is closely proportional to the stress applied, at least up to the point of failure, or fracture, when the deformation suddenly becomes gross and continuity of structure is lost. This deformation under normal load is real, though it is small and not ordinarily obvious; but it is a measurable quantity even for steel, which is far more elastic than bone, so that we can assume considerable dimensional changes within a bone that is bearing load. Strain is undoubtedly one of the chief influences directing the deposition of bone matrix by osteoblasts. In all that the osteoblasts can be seen or presumed to be doing (or, for that matter, the osteoclasts as well), the rule is that structure is so laid down as to maximize elasticity, maximize the working cross-section, minimize unnecessary material, and minimize strain. Osteoblasts continuously solve some extremely difficult problems of engineering, provided the necessary materials are at hand.

Physiologic osteoporosis calls for no correction as such, but the lost mineral may be too much to eliminate in a short time and may give rise to urolithiasis; for that, valuable measures have been devised. If, however, there is any doubt whether or not an adult will readily regain bone density and strength on being allowed up, the plan of management used for other forms of osteoporosis may be desirable.

A similar, responsive osteoporosis develops in arthritis, in which pain leads to immobility and a refusal of loading. Thus it is a constant feature of rheumatoid arthritis of sufficient duration and severity, and here it has great significance because of the deproteinizing action of adrenal steroids, which almost inevitably will be used, and which, as will be mentioned, are themselves a cause of osteoporosis. This adrenal steroid effect cannot be ascribed to the age and sex of the patient (that is, it is improper to contend that if the patient is a postmenopausal woman, some osteoporosis might be present in any event (1)), because it has been noted in young women (2), older men (3) and a 9-year-old boy (3).

By adrenal osteoporosis we mean not only that of Cushing's syndrome, which is rare, but also the widespread drug-induced syndrome that might be called cortisone osteoporosis, which is similar in certain respects. Corticotropin, or ACTH, has been less often the cause of osteoporosis, probably because it is less widely

used. Either syndrome presents with changes in bodily and facial contour, hirsutism and disturbed fluid balance; there may be no symptoms associated with demineralization of the skeleton, or there may be pain in the back, sometimes with acute onset during effort, that finally suggests a roentgen film of the spine. Then the demineralization and one or more compression fractures are detected, and with some misgivings the cortisone or corticotropin is stopped. These events take place after six months or more of intensive dosage, but they may occur more rapidly, depending on individual factors that are not understood but probably include the sex of the patient and the diet. They are not by any means inevitable, as will be explained.

To recall briefly how this action of adrenal steroids is exerted, we might say there are two broad classes of hormones which affect protein synthesis throughout the body: 1) the anabolic steroids, chiefly gonadal hormones, which so influence the utilization of materials that protein will be formed; and 2) the catabolic or adrenocortical steroids, as exemplified by cortisone, which influence utilization in such a way that carbohydrate, rather, is formed. Of the materials to be utilized, some derive from the food ingested, but a part originates in existing protoplasm which, in the usual way, disintegrates and yields its chemical components. In view of this constant turnover of body materials, it is a proper abbreviation that adrenal steroids affectively translate protein into carbohydrate. They do so at the expense of protein required for healing, for the control of infection, and for the maintenance of muscle, connective tissue, nerve cells and bone matrix.

The form of osteoporosis most commonly recognized is that following the menopause, attributed to a decline in gonadal activity. It does not follow immediately or directly after the menopause. For example, in Donaldson and Nassim's series of 94 women having an artificial menopause, there were 12 in whom osteoporosis became evident; however, the period of development ranged from a mode of three years to as long as thirteen years; another 19 women with spontaneous menopause were admitted for pain in the back after periods ranging from two to thirty-two years, with an average of fifteen years (4). Albright, Smith and Richardson (5) showed some time ago that osteoporosis becomes evident nine or ten years after the menopause, however induced. The disturbance takes considerable time to develop, and considerably longer to be recognized.

Postmenopausal osteoporosis then merges indistinctly with osteoporosis of later life, which occurs in either men or women—so-called senile osteoporosis, arbitrarily defined as that of patients over 65. By that time the condition must be explained by declining production of such anabolic steroids as are produced in the adrenal cortex, or the mildly catabolic balance of later life, together with such personal factors as susceptibility, diet, and a sedentary way of life. There are no clinical features as yet that distinguish postmenopausal from later osteoporosis, or these from the unexpected but distinct osteoporosis due to unknown cause in healthy, considerably younger adults.

One additional cause of osteoporosis is hyperthyroidism, which is mentioned for the sake of completeness, since it is not likely to present a diagnostic problem. However, it is a nice demonstration of unbridled catabolism, with protein losses

of every kind, in which a compromise of the bone matrix might be expected and is often found.

DIAGNOSIS

The circumstances in which these forms of osteoporosis occur are self-evident, but the diagnosis often is not. The classic presentation is an acute episode of girdling abdominal or precordial pain following slight exertion or none, which may immediately go on to collapse, so that the first impression is coronary occlusion; or there may be a mildly disabling pain in the back, with the patient having a definite recollection of the onset, although it may be some time before aid is sought. In either event, an x-ray examination is made and it is discovered that one vertebral body has just collapsed. It is usual to find that several, possibly seven or eight, have assumed the so-called codfish outline in which the intervertebral disc bulges through the collapsed plate above and below. In retrospect, there is noted some kyphosis and the patient may have noticed a loss of height.

The more difficult problems are those in which pain in the back has been progressive and the x-ray appearance is uncertain, with a possibility of metastatic neoplasm or multiple myeloma. It is only when a primary tumor cannot be found and the patient remains alive and well, until finally the x-ray picture is more distinct, that a diagnosis is reached by a kind of exclusion. If the patient dies, it was not osteoporosis.

There remain, however, a large number of cases in which multiple fractures of the ribs, pelvis and vertebral column occur without any symptoms and with uneventful recovery, and the diagnosis is made in retrospect when an x-ray film is obtained for some other reason. It is likely that a great many of the ordinary fractures of the hip, usual in the osteoporotic age group, are pathologic rather than traumatic and are due to osteoporosis. For some time it has been suspected that these femurs are fractured before the patient strikes the floor; that is to say, they are fractured by relatively slight force. The bones are customarily described as "brittle," possibly with great truth. The fracture is managed surgically, and almost never are hormones given as a supportive measure. Difficulties in healing are ascribed to impaired blood supply.

The distribution of osteoporosis, as a diagnostic pattern, depends on what is understood by this entity, and so does the diagnosis. Even in senile osteoporosis, so-called, a pubic ramus or several ribs may be fractured without acute manifestations. Although attention is usually confined to the vertebral column, in Cushing's syndrome areas of the skull may be decalcified, as well as the ribs, spine and long bones. Generally the lamina dura of the teeth is intact, as it may not be in hyperparathyroidism.

To the radiologist, osteoporosis classically means a disease of the vertebral column. It is manifested by a general translucency of the bones, a haziness or blurring of the fine structure progressing toward sparseness of the trabeculae so that they appear to form a coarser mesh than expected, and perhaps some thinning of the cortex, as can be seen in the long bones. Some observers (6, 7) have suggested that the transverse lines disappear early, although the vertical trabecu-

lations persist. In any event, the changes are indistinct and subjective and depend more on the technique used than on the mineral content of the bones. Many radiologists insist they can recognize these differences with confidence, and are rather sensitive about it, but others are working to improve the diagnosis (8–10). Ordinarily a demineralization of less than 30 per cent does not strike the eye, but recent studies (9) in patients with poliomyelitis have identified losses of only 2 per cent in the lower extremities; and in an effort toward more objective comparisons, graded thicknesses of ivory have been photographed simultaneously with the part (10). (Parenthetically it might be added that graded thicknesses of aluminum foil—household freezer foil, usually one-thousandth of an inch thick—afford a good densitometric comparison, and are easier to obtain than ivory.) However, there has been, and still is, a narrow idea of the disease. Some years ago the callus that formed at rib fractures in Cushing's syndrome was so perplexing that biopsies were actually made (11), and a recent British report asserted that in that disease *fractures* are a more common feature than *osteoporosis* (12), as if these were distinct entities.

As to laboratory findings, unless there has been an acute incident such as a fracture for which the patient has been put to bed, there is nothing unusual to characterize osteoporosis. This is diagnostic. The serum calcium level is normal, the serum inorganic phosphate level may be somewhat high, and that of alkaline phosphatase is normal. Unless the patient has been immobilized, urinary calcium is not elevated. A low concentration of serum calcium suggests an entirely different disease, osteomalacia or adult rickets, unless the serum protein level also is low—when the apparent serum calcium level will be reduced, owing to the share of calcium that is usually bound with protein (roughly half). If the concentrations of calcium and protein are both reduced, a fairly serious grade of malnutrition may be present. High levels of serum protein and globulin, and a specific proteinuria, should direct attention to multiple myeloma; in this condition calcium and often phosphate levels are also elevated. These specific findings, like those of hyperparathyroidism, which presents quite differently, make the diagnosis of osteoporosis unlikely, since in the latter disorder there is not apt to be any striking chemical abnormality.

MANAGEMENT

Specific diseases such as hyperthyroidism and Cushing's syndrome require the indicated management, and the osteoporosis is an incidental feature that may suggest the desirability of protein anabolic therapy, in addition to other measures that may be adopted.

Cortisone osteoporosis is an indication for withholding the drug, in the first instance, but there remains the decision whether the patient is better off to stay on her feet and continue using the affected bones, as she may be able to do with palliative treatment (13) under the protection of anabolic agents given concurrently. In these circumstances most of the trouble could have been prevented by using anabolic therapy together with, and as a strict condition to, the use of cortisone or similar materials. (We have for some years been endeavoring to estab-

lish the conditions under which these drugs can be utilized to do more net good than harm, but unfortunately the procedures involved seem too much trouble (14), at least until things finally go wrong.)

For postmenopausal, senile and idiopathic osteoporosis, between which no useful distinction can be made here, the first task of management is to mobilize the patient in every conceivable way, short of causing pain; and the second is to institute a definite plan of steroid hormone therapy, using testosterone and estradiol together. These hormones in combination constitute a form of protein anabolic therapy, which has wide application in catabolic states and perhaps in the entire physiology of aging.

Although the specific sexual effects of testosterone and estradiol, respectively, are unnecessary in this program and usually undesirable, their anabolic effects are fortunately additive, and for any patient a working ratio of androgenic and estrogenic steroids can be found which is effectively neutral. An approximate ratio of 20 to 1 is suitable to begin with, using testosterone propionate and estradiol benzoate as the reference compounds, in either men or women; but the ratio is not automatic or universally applicable, and it is necessary to see what will happen after a few weeks and make the desirable adjustments in due course. The fact that these compounds in predetermined ratios are commercially available does not obviate close observation and readjustment. A more precise ratio might be 15 or 18 to 1, for example, because for most women 20 to 1 induces definite endometrial atrophy in a few months, with a vaginal smear that tends progressively to become atrophic (15).

Only three of the four possible imbalances are actually observed. There is no clinical sign of excess testosterone therapy in the adult male. In the female, however, hoarseness, or irritability of the genitalia suggests too high a proportion of androgen—the vaginal smear is atrophic before this. Excess of estrogen gives rise to uterine bleeding and, in either sex, sensitivity of the breasts. If uterine bleeding is immoderate or prolonged, and careful examination shows no serious reason for it, the estrogen is simply discontinued for a week and an oral progestin—such as 100 mg. daily of ethinyl-testosterone (pregneninolone)—is given to modify the endometrial reaction, induce definite self-limited bleeding, and clear the prevailing excess of estrogen. Occasionally bleeding takes place in the presence of marked endometrial atrophy; after some manoeuvering, finally estrogen alone is given to overcome the atrophy, and the bleeding eventually comes under control. It is mandatory to follow the vaginal epithelium by smear if there is doubt about what is happening.

Except that the two hormones must be fairly balanced for the patient, absolute dosage is not critical; but it should be high, literally 20 mg. of testosterone propionate and 1 mg. of estradiol benzoate three times weekly, or oftener, at the outset. One way of reducing the proportion of androgen is to add 0.1 mg. or even 0.2 mg. of estradiol benzoate to the original fixed ratio; or androgen can be increased in steps of 5 mg. added to the dose. Less intensive therapy merely takes longer but there is, in any event, no exact measure of the rate of progress. (If the patient were followed in a careful metabolic study, it would be seen that one

action of both testosterone and estradiol is to change the nitrogen balance from negative to positive: that is, the loss of nitrogen from the body is halted, and nitrogen is incorporated into the protein of new tissue, such as bone matrix. The action of testosterone is much more pronounced than that of estradiol, but this may be largely a matter of the doses it is possible to use—that of estradiol is never of an order greater than milligrams. Estrogens, even in minute doses, seem to have more specifically an action favoring positive calcium balance; they are usually said to stimulate osteoblastic activity. However, in the usual course of therapeutics these elaborate studies are not feasible or perhaps necessary.)

After a few weeks, when the patient is seen less often and injection is not always possible, there are compromises such as giving the dosage less frequently, and giving part of it orally.

There are several practical details. Methyltestosterone is not an entirely satisfactory substitute for testosterone, as it has some special effects, including pronounced salt- and water-retention in some patients, gynecomastia, and insomnia; mercurial diuretics may be needed if it is used. The effects of so-called lingual therapy with methyltestosterone cannot be distinguished from those of simple swallowing of the same dose (except that it is enormously more trouble). Buccal tablets of testosterone or testosterone propionate are a satisfactory method of administration, if the patient has a good response; not all patients respond alike, even with equal or greater dosage. As to the estrogen, stilbestrol is not a satisfactory substitute because it is nauseating in sufficient doses, estradiol by mouth (that is, simply swallowed) is relatively inefficient, and estrone sodium sulfate "conjugates" have to be taken in unreasonably large quantities. The choice lies between estradiol by buccal administration, if it is effective, and ethinylestradiol by mouth, if it is well tolerated. Some physicians have implanted pellets, particularly of testosterone alone, but pellets do not afford control over what is happening, and changes in dosage have to be made frequently in any case.

This general program applies as a prophylactic anabolic scheme, in whole or in part, in patients receiving cortisone and similar therapy.

As to general measures, the patient who has been immobilized and put to bed is harassed in every possible way to perform whatever motions are possible with the hands, arms and feet over the edge of the bed. There is some degree of apprehension about pain before pain is actually felt, and with reassurance the range of activity can be much increased. As soon as it can be done without distress, the patient is urged to get out of bed and sit in a chair, and then in a wheel chair, and is further urged to travel back and forth in it and otherwise carry on as violently as possible without causing pain. If there has been an acute injury, it may be a month or longer before the patient is able to move about freely, but it is a curious fact that badly collapsed vertebrae, unassociated with neurologic signs, are apparently not a serious handicap to activity. Activity is the greatest single stimulus to the laying down of new matrix and, given a passable diet, matrix is a sufficient condition for calcification and bony strength. Finally, at the earliest reasonable moment, the patient is driven out of the house to find a greater range of activity and better appetite outdoors.

The diet should be proteinaceous, and it should contain milk (not less than three glasses daily) if the patient will accept it; otherwise it should contain 5 Gm. or more of a calcium preparation for ingestion. Since it is impossible to obtain milk which does not contain vitamin D, some 100 units per glass, a small quantity of D will be ingested in any event; it is probably undesirable to add more, and dangerous to introduce the usual therapeutic range of dosage. As to newer measures calculated to improve calcium uptake, such as strontium (9), these seem to be highly promising and a final determination of their usefulness is awaited with interest.

The criteria of good progress are how rapidly the patient recovers from an acute episode, and how well the general health is maintained without a further incident. The x-ray picture is not a useful criterion, as it may be years, if ever, before such improvement is evident (except for the healing of fractures). The weight of the appraisement is clinical.

The wide application of steroid hormones, notably of testosterone, as a protein anabolic principle probably deserves the greatest encouragement, for, as Henry Turner (16) remarked some time ago, we have in testosterone the first authentic intercession in the aging process to date; and the combination with estradiol is a universal and manageable one. The possible contraindications in a patient who has been duly examined are essentially meaningless. This general plan of treatment is, or would seem, the most widely applicable and the most incisive form of geriatric management.

SUMMARY

Osteoporosis is a general disease of bone, precipitated either by specific cause or by catabolic influences characteristic of advancing age, when it is undoubtedly no more than a part of the general catabolic trend of later life. As a disorder of bone physiology, management is best approached by requiring the most active loading or stressing of the bones within reason. As a disturbance of protein synthesis, treatment should involve a nutritious diet and the benefit of combined androgen and estrogen therapy in a balanced or neutral ratio of doses. At present, this is the one practical means of reversing the unfavorable balance of tissue metabolism with advancing age.

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THE PATIENT WITH INCURABLE CANCER

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Although it is the hope and desire of all specialists in the field of cancer to treat potentially curable patients they, nevertheless, must frequently treat the incurable one. In spite of increasingly early diagnosis of cancer, in spite of slowly improving results in the treatment of cancer and in spite of heartening discoveries in the broad field of cancer research, many patients with cancer die of this disease. The following presentation is based on the author's experience in the treatment of many patients with incurable cancer, both in the clinics of Memorial Hospital and in his own practice, but the opinions contained herein are purely the author's own and do not necessarily reflect the current aims of the Memorial Cancer Center nor agree with the views of all of his colleagues there.

All of the following, therefore, has to do with palliation. Lest there be some misconception as to the meaning of palliation, let it here be defined as *the preservation of relatively normal and comfortable life in the face of an inevitably fatal outcome*. Although life is occasionally prolonged by such palliative therapy, the mere prolongation of life is, in itself, no objective.

GENERAL CONSIDERATIONS

Regardless of the type, location or extent of the incurable neoplasm, certain considerations are of sufficient general applicability in the management of the patient to warrant separate discussion.

The pronouncement of incurability

Before incurability of any cancer can be considered, proof of the cancer itself must first be had. The only incontrovertible proof of cancer is that obtained through pathologic study of suitable biopsy material. Several illustrative cases deemed incurable by exploration in other institutions, but without biopsy, could here be presented in which "cure" was readily obtained because cancer was, in fact, not present. The importance of histologically proven cancer, therefore, cannot be underestimated and such proof must be had before palliation can be intelligently considered. A very real disservice may be done a patient by uncertain criteria of incurability. Hardly a day passes in a large cancer institution in which a patient is not seen who has previously been pronounced as incurable on the basis of insufficient evidence. This usually occurs as a result of treatment in one of three ways: Either the patient has been hastily explored with insufficient preparation by a relatively inexperienced surgeon with inadequate assistance; or, the patient has been treated in a university center by a highly trained surgeon who illogically bases his *ex cathedra* pronouncement of incurability on his knowledge of statistical cure rates rather than on his objective findings; or, finally, the patient has been explored in a first-rate surgical clinic where unrealistic schedul-

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ing of surgical cases makes the performance of a four to six-hour operation an impossibility. It is most necessary, therefore, to evaluate any given patient carefully and, when positive evidence of incurability is wanting, to undertake therapy designed for cure without delay. It has most truthfully been said that there is no palliation like cure!

Shall the patient be told?

Many distinguished physicians feel that all patients with cancer should be told the diagnosis. The arguments favoring such a policy would be far more convincing if they came from physicians who actually attend the dying cancer patient rather than from large medical centers where surgical treatment of operable cases predominates. The patient who protests that he can "take it" and that he wants to know if he has cancer invariably means that he wants to know that he does *not* have cancer.

In my opinion, it is absurd for a physician who has spent ten, twenty or more years studying the science and practicing the art of medicine to discuss the diagnosis, methods of treatment and the probable results of therapy in detail with a patient who, at best, can bring but rudimentary comprehension to the problem at hand, to say nothing of a most personal interest and hardly impartial judgment! If this be true for the patient with early and potentially curable cancer, it is even more true for the patient with incurable cancer. Obviously the patient must be told something. The words tumor or growth may be freely employed or the physician may refer to "liver trouble" or speak of pleurisy or speak rather generally of a reaction to treatment previously administered. There is hardly a manifestation of advanced cancer that is not duplicated by one or more diseases, familiar and acceptable to the layman which may be named in discussing the patient's symptoms.

There still is the occasional patient who, because of peculiar responsibilities or impending decisions of great importance, must be acquainted somewhat with his prognosis, more for the protection of others than himself. Perhaps he should be told that he has incurable cancer. By telling such a patient that his treatment may be prolonged and that his convalescence most unpredictable, the doctor can usually persuade him, of his own accord, to pass on those responsibilities and decisions to family, business associates or friends.

What about the physician with incurable cancer? Without meaning to belabor the issue, I still have never frankly told a physician, surgeon, medical scientist or other professional man that he is dying from cancer. They often know the truth but by not forcing the issue I believe that the difficult attending physician-physician patient relationship is made tenable for both parties. When all other resources have faded, there always remains in the dying patient's mind the hope that what his reason tells him to be a fact may somehow not be true. Why should this last refuge be denied a man merely because he is a physician?

The obligation of the physician

When incurability of cancer has been positively established, it is the practice of many physicians to return the patient to his family with a generous supply of

opiates on the assumption that further active therapy "just prolongs the suffering." The customs and conventions of the past sanction such a course. For the physician who questions this policy, however, attention is again called to the definition of palliation, namely, the preservation of life as long as it can be maintained in relatively normal and comfortable fashion. It seems obvious that the latter is not only the more humane but also the more modern course to follow and that the obligation of the physician assuming the care of an incurable cancer patient therefore must be to accomplish palliation in the sense just defined.

Withholding the therapeutic hand

Equally as undesirable as the policy of overwhelming the cancer victim with opiates is that of subjecting him to a barrage of therapy, often including the newest chemotherapeutic agents, with no consideration of the patient's particular complaints or of the therapeutic agent's particular applicability. Many incurable cancer patients may have weeks or months of relative freedom from symptoms. It cannot be sufficiently emphasized that during such a period *no* active therapy should be undertaken.

Consider the patient, not the disease

It is axiomatic in the practice of those specializing in cancer to treat the disease accurately, aggressively and adequately, sacrificing whatever organ, structure or function necessary when cure is possible. When cancer is incurable, however, the disease process must be submerged to the interests of the patient as a whole. Thus, when cancer of the stomach is treated curatively the entire stomach may have to be resected and a certain degree of gastric invalidism may have to be accepted as an inevitable sequela.On the other hand, when gastric cancer is incurable, the physician must then forget the cancerous stomach and treat the indigestion, the substernal distress, the anorexia, the weakness, the anemia or whatever other symptom may be presenting. Individualization of treatment is essential and often improvisation of treatment methods or judicious combination of several therapeutic modalities is required. The art of the family doctor ranks far above the science of therapeutics when the patient with incurable cancer is well managed!

SPECIFIC CONSIDERATIONS

If the practitioner undertaking the care of a patient with incurable cancer accepts the general considerations already discussed, the presentation of specific problems would seem both superfluous and inconsistent, since no two patients will require identical treatment, and individualization of treatment is of paramount importance in accomplishing palliation. Nevertheless, many incurable cancer patients present one or more of the following problems. These then are presented as specific problems with no intention of being absolutely applicable to any specific patient or of exhausting the many problems encountered in successful palliation.

Nutrition

The wasting away of the incurably ill patient is an occurrence equally as familiar to the layman as to the physician, and often a phenomenon more distressing

to the loved ones of a patient than to the patient himself. It is manifestly impossible to prevent loss of weight and substance in the patient with incurable cancer but it is often possible to mitigate somewhat this distressing sequence of events.

In cancer of the oropharynx, esophagus or gastrointestinal tract the cause of weight loss and poor nutrition may be as much due to mechanical factors as to widespread dissemination of the tumor. The patient who is unable to eat because of an incurable cancer of the tongue may be considerably helped by gavage feedings, employing a simple rubber or plastic nasogastric tube which the patient can readily be taught to insert and remove himself, and a feeding mixture simply prepared from his family's table by means of an electrical food blender. The patient with incurable cancer of the esophagus may be similarly helped by the performance of gastrostomy, a relatively minor surgical procedure which may be carried out under local anesthesia.

A totally obstructing pyloric cancer presents a more difficult problem, since simple gastroenterostomy is, nonetheless, a major surgical procedure, is often technically impossible and sometimes proves therapeutically less rewarding than might be anticipated. The same may be said for a jejunostomy for feeding purposes. Feeding via jejunostomy is so often accompanied by severe symptoms of the "dumping syndrome" or by an almost intractable diarrhea as to make its use for palliation decidedly open to question.

Case #1. L. B. Six years before her admission to the Memorial Hospital Clinic in April 1934, this 36-year-old housewife had had a soft-part sarcoma of the left arm removed, and three subsequent operations for recurrence had been performed elsewhere. Palliative x-ray treatment, as was the custom at the time, was administered to the recurrent sarcoma of the arm over the next four years. There was definite temporary improvement, even though the lesion proved to be a characteristically radio-resistant fascial fibrosarcoma.

In November 1938, the patient first noted dysphagia, which progressively increased over the following months. Radiographic studies demonstrated direct extension of the growth into the left upper chest and mediastinum, with compression of the esophagus. When obstruction became complete, a Janeway gastrostomy was performed in August 1940. Since that time the patient has subsisted entirely by gastrostomy feedings. There has been slow steady progression of the tumor, and in May 1949 the patient finally accepted palliative shoulder-joint disarticulation for her edematous, useless extremity. Nevertheless, she has been otherwise free of symptoms. She was last examined on June 27, 1955, almost fifteen years since her gastrostomy.

Comment. This woman with incurable cancer would undoubtedly have died of starvation some fourteen years ago had gastrostomy not been performed.

Weight loss and general debility may not be due to mechanical causes but rather, may be associated with the inexorable progress of the neoplastic process. The patient complains merely of marked anorexia. So often the zealous practitioner insists on a diet rich in protein, minerals and vitamins. This is scientifically correct but is practically likely to fail. How much better, actually, to determine what the patient formerly liked and prescribe this, often abetted by an ounce of brandy, whiskey or dry wine a few minutes before dinner. The ailing Italian patient will much more readily respond to lasagna, the Jewish patient to "gefulte fish," the Chinese patient to rice, the Irish patient to tea and toast, than any of them will to sweetbreads or rare beef.

Although many physicians prefer to prescribe whiskey as a stomachic, there are many other useful proprietary preparations. Five units of regular insulin may be given thirty minutes before meals. Testosterone propionate, usually 25 milligrams every other day, may be beneficial because of its general anabolic effect. Finally, the timing, spacing and frequency of meals may be varied to attract the flagging appetite. As a rule, frequent small feedings are more palatable and attractive than fewer full ones.

Anemia

The weakness and easy fatigability of the incurable cancer patient may be somewhat improved by attention to the frequently associated anemia. Although a macrocytic, hyperchromic anemia may occasionally antedate the recognition of a gastric cancer in an anacidic stomach, and may presumably persist if and when the cancer becomes incurable, by far the majority of anemias observed in the incurable cancer patient are of the hypochromic type. Often the anemia is caused by chronic blood loss from the primary tumor or its metastases. The anemia may be a myelophthisic one from replacement of marrow by metastatic tumor cells, or it may be purely a nutritional one from inadequate food intake, as previously described. It may be the anemia associated with any chronic disorder (*e.g.*, chronic nephritis) or, as is probably the usual case, may be due to a combination of any or all of the foregoing mechanisms.

Although there is usually little scientific justification for the use of crude liver extract, or vitamin B_{12}, in the management of the anemia of advanced cancer, there often appears to be some nonspecific beneficial effect from its use. Furthermore, the physician may profitably combine the administration of liver extract or vitamin B_{12} with that of any broadly therapeutic vitamin preparation.

The time-honored specific for secondary anemia is iron, but the use of whole blood transfusions is much more expeditious. With the wide distribution of blood banks today, and the simplicity of giving a transfusion as an outpatient procedure, it is easy to supplement iron medication with whole blood transfusion every second or third week, as required—accepting the hazard inherent in banked blood, *i.e.*, the possibility of homologous serum hepatitis.

Case #2. G. M. This 57-year-old woman had had a left radical mastectomy performed elsewhere in 1939 for carcinoma and was admitted to Memorial Hospital in September 1945 for treatment of multiple metastases to bone. Palliative x-ray therapy was administered to many sites at various times during the ensuing three and a half years, with prompt symptomatic relief. The x-ray therapy combined with several courses of androgen therapy together seemed to maintain the patient in strikingly good condition and in freedom from pain in spite of increasingly widespread osseous metastases.

Seven months prior to her death, the patient was found to have a pancytopenia, manifested only by weakness, lassitude and easy fatiguability, undoubtedly due to destruction of functioning marrow by metastatic cancer or by roentgentherapy. During the six-month period, September 1948 to March 1949, the patient was given 19 whole blood transfusions, so spaced as to maintain her hemoglobin level at about 12 Gm. per cent. Her symptoms were relieved until her rather rapid exitus in April 1949.

Comment. Palliation, already accomplished for three years by combined x-ray and androgen therapy, was extended for six months longer in this patient by the use of multiple blood transfusions for the relief of a myelophthisic anemia.

Obstruction

Respiratory, intestinal, biliary or urinary obstruction secondary to an incurable neoplasm is invariably a serious complication and almost always requires surgery for correction. Whereas tracheostomy and colostomy are relatively simple procedures for the surgeon to perform and for the patient to tolerate, the same is, unfortunately, not true for operations to relieve small-bowel, biliary or urinary-tract obstruction. Corrective procedures require the services of an experienced surgeon and the patient is necessarily subjected to a major surgical experience. Nevertheless, relief of the pain and projectile vomiting of small-bowel obstruction, of the intractable pruritus of obstructive jaundice, or of the fever, chills and pain of an obstructed ureter justify the procedure if the patient has a reasonable chance of surviving the operation. Cautious roentgentherapy may, on occasion, be employed when obstruction has been caused by Hodgkin's disease, lymphosarcoma or some other equally radiosensitive tumor.

Purely from the standpoint of surgical philosophy, a plea should be made for the performance of admittedly palliative resections in selected situations. The patient with an obstructing carcinoma of the sigmoid colon with multiple liver metastases, for instance, will often be better served by palliative sigmoid resection and anastomosis than by simple loop colostomy. Not only will the local cause of obstruction be thus removed but the patient's normal means of bowel function will be preserved and the danger of subsequent chronic or acute blood loss from the tumor prevented.

Case #3. E. D. F. A 42-year-old housewife had had bilateral "cyst-adenomas" of the ovaries removed elsewhere in 1932. She then remained well until 1949 when, because of obstructive symptoms, she was re-explored elsewhere and diffuse ovarian carcinomatosis found. Intensive roentgentherapy was administered to the abdomen. Recurrent obstructive symptoms a year and a half later demanded surgical intervention again and a transverse colostomy was performed. Unfortunately, this did not relieve the obstruction.

On admission to Memorial Hospital the patient was found to be markedly emaciated, weighing only 75 pounds, and presenting a large lower abdominal mass extending into the cul-de-sac. On May 3, 1951 a massive resection was performed of the lower abdominal mass, reproductive organs, portions of ascending and sigmoid colon and two loops of obstructed small bowel, leaving diffuse peritoneal carcinosis behind. The patient's convalescence from this extensive procedure was uneventful.

Comment. This patient is living, more than four years since her radical operation. Recently, additional roentgentherapy has been required, because of further progression of her residual cancer. Yet, during these four years the patient has continued her secretarial job in addition to her housekeeping and has made one trip across this country as well as an extensive tour of Europe.

Effusions

Many patients with incurable cancer present troublesome pleural or abdominal effusions at some time during the course of their disease. Most physicians, if they employ any active treatment whatsoever, rely on diuretics and salt restriction to relieve the discomfort of these complications, overlooking the ease with which thoracenteses and paracenteses can be performed on an outpatient basis. Repeated paracenteses at intervals of ten days to two weeks may, in selected cases, provide significant palliation for several months.

Case #4. F. P. Four years following a right radical mastectomy for carcinoma this 71-year-old widow noted the onset of painless enlargement of her abdomen. On examination a fluid wave and shifting dullness were readily noted and, following removal of 10½ quarts of clear yellow fluid, a hard, nodular liver was readily palpated.

On the assumption that the patient was in the terminal stages of incurable cancer, and in view of the fact that she had no other significant symptoms than the ascites, it was decided to employ no specific therapy but to allow the patient to spend her remaining days at home. Instead of rapidly declining, however, the patient continued to live quite comfortably, requiring abdominal paracenteses every seven to ten days. Twenty-nine paracenteses were performed before the patient's rather sudden demise on June 10, 1950.

Comment. Very effective palliation was afforded this patient for nine months merely by the performance of repeated abdominal paracenteses.

In recent years the use of radioactive gold in the treatment of such effusions has become increasingly popular and in many cases has lessened the frequency of repeated paracenteses or has removed the need for them altogether. Treatment with Au^{198}, however, requires hospital facilities for the proper handling of the radioactive isotope and for the protection of others from possible radiation effect.

Nitrogen mustard (HN_2 hydrochloride) has also been injected intrapleurally for pleural effusions of neoplastic origin with some success. Following such therapy the patient must be carefully checked for white blood cell and platelet depression, just as when HN_2 is administered intravascularly.

Pain

The greatest challenge to the effective treatment of the patient with incurable cancer is the management of pain when it occurs. Although patients with bone metastases may have excruciating pain, many patients will run the whole course of their disease with no pain of any degree. So ingrained in physician and layman alike is the belief that incurable cancer is painful that proper evaluation of the patient's symptoms is often overlooked. If a careful history is taken it may be determined that the patient's complaint is one such as, substernal burning, abdominal cramps, tenesmus, or sometimes paraesthesias (!) rather than true pain. Or, again, an elderly patient may complain of a pain in the back not in the least inconsistent with osteoarthritis and responding satisfactorily to a fracture board under the mattress, local heat and salicylates. Time-honored home remedies need never be disparaged in the management of certain symptoms associated with incurable cancer.

Unfortunately, certain patients with incurable cancer do have severe pain. Most of these patients have either metastases to bone (even if not demonstrated radiographically), or direct invasion of nerves by the tumor. Palliative x-ray therapy contributes much in this group of patients.

Case #5. R. S. This 49-year-old woman had a right radical mastectomy performed for carcinoma on December 3, 1951. She then remained well until May 1953, when she complained of progressive pain in the back radiating around the thorax. Roentgenograms showed osteolytic metastases to the dorsal spine and ribs. Moderate doses of high voltage x-ray therapy were delivered to the affected areas in May and June 1953, with prompt relief of symptoms. Pain from other bone metastases developed but was readily relieved by further palliative x-ray therapy, later supplemented with testosterone therapy, until

the summer of 1954. Then there was rather rapid progression of symptoms, requiring that the patient be hospitalized for terminal care. She expired on September 5, 1954.

Comment. Palliative x-ray therapy to numerous areas of bone metastasis, later supplemented by testosterone therapy, provided this patient with effective palliation for more than a year.

Even metastases to bone from notoriously radioresistant tumors like malignant melanoma may be symptomatically relieved by well planned roentgentherapy.

Rhizotomy and cordotomy are most valuable neurosurgical procedures for the relief of intractable pain from cancer in a highly selective group of patients. Such neurosurgical operations seem to be much less frequently employed today than formerly, probably because of a better understanding of what can be accomplished thereby and a more restrictive selection of patients. Prefrontal lobotomy has not proved particularly rewarding in the management of pain in the incurable cancer patient.

The practitioner is still faced, in certain cancer patients, with the problem of dispensing analgesics. Certainly one of the most basic obligations of the good physician is to relieve suffering, and opiates must not be withheld when other measures become ineffective or fail. It is well to start with generous quantities of salicylates or one of the related proprietary preparations. As the salicylates and related medications become ineffective, methadone in doses of 5 to 15 mg. every four hours may be substituted. This in turn may be supplanted by meperidine in doses of 50 to 150 mg. which usually must be repeated every two to three hours because of its shorter effective duration. Codeine with salicylates may then be introduced.

In general it is well to maintain the incurable patient on oral medication as long as feasible and change to hypodermic medication only when the patient becomes truly terminal. When hypodermic medication becomes necessary, therefore, morphine or one of its analogues is usually required. The addition of scopolamine to such medication is often indicated, since the mental confusion so produced dulls the patient's awareness of his critical condition. The patient's family or attendants should be advised of this anticipated effect of scopolamine.

One word of caution: Never institute opiate medication if any other therapeutic program is contemplated, since the inevitable addiction will vitiate results that might otherwise be obtained.

Coincidental chronic disorders

This consideration is so obvious as to require little comment. In the complete management of the patient with incurable cancer meticulous attention must continue to be given to diabetes mellitus, angina pectoris, bronchial asthma or any other coincidental chronic disorder in order to accomplish effective palliation.

Case #6. L. F. This 54-year-old executive had a total pancreatectomy performed on December 4, 1951 in the belief that cancer of the pancreas was present. Pathologic study of the specimen, however, showed only chronic cicatrizing pancreatitis. As a result of this surgery the patient became diabetic, requiring careful dietary regulation in conjunction with insulin and pancreatin medication. One and a half years later the patient was found

to have hyperthyroidism, which was electively treated with radioactive iodine. Following destruction of thyroid function with this agent the patient then required thyroid replacement therapy. A mass in the lower right abdomen was noted and on November 3, 1953, the patient had a right colectomy performed for adenocarcinoma with node metastases. Bilateral pulmonary metastases were then discovered in February 1955, but have remained asymptomatic to the present. Although the patient has been recently hospitalized for gastrointestinal bleeding, he had been continuing his regular business and home life without significant complaints until this recent hospital sojourn.

Comment. By careful attention to this patient's sensitive diabetic state and by continuing pancreatin and thyroid supplementation, this patient with incurable cancer led an essentially normal life until recently.

Coincidental acute emergencies

Equally obvious, but less well observed, is the need for prompt and adequate treatment of most acute emergencies that occur as a result of, or sometimes independent of, the incurable cancer. The temptation to consider such an emergency a visitation of God and a release for the patient from his so-called "suffering" may in certain instances be valid. Attention is once again called to the definition of palliation, namely, the preservation of relatively normal and comfortable life, and the suggestion offered that this be the criterion on which to decide whether active therapy is indicated or not for an acute coincidental emergency.

Case #7. H. S. This 28-year-old clerk had a right interscapulo-thoracic amputation performed on October 11, 1954 for a synovial sarcoma of the right arm which had twice recurred, both locally and in the right axilla, following surgical treatment elsewhere. His immediate convalescence was rapid and uneventful and he returned to his home and job. He was seen as an emergency on January 18, 1955 because of severe dyspnea, cyanosis and shock. Thanks to an exceptionally alert and competent resident, bilateral "spontaneous" pneumothorax was identified and promptly treated. Bilateral pulmonary and pleural metastases were subsequently demonstrated and the patient was given palliative x-ray therapy and intrapleural nitrogen mustard therapy. The patient returned to his home and remained in fairly good general condition without serious complaints until shortly before his death from cancer on May 23, 1955.

Comment. It is obvious that this patient could not have survived at all if prompt and expert attention to his bilateral pneumothorax had not been instituted.

Psychotherapy

Some consideration has already been given to this exceedingly important factor in the previous section having to do with whether or not the patient should be told he has cancer. A confident and optimistic attitude on the part of his physician is a rock to which the incurable cancer patient clings in his sea of shifting doubts, despair, worry and fear. By attention to one symptom at a time, by a reasonable (though manifestly incomplete) explanation of same, and by a positive therapeutic approach, the physician acquires those characteristics of confidence and optimism so necessary for the tranquility of the dying patient. Completely ineffective therapy of one form or another may, on occasion, be intentionally given purely for its favorable psychologic effect. A readiness to talk with the patient and a willingness to answer his questions, although demanding considerable mental agility on the part of the physician, is of paramount importance in the psychologic management of the incurable cancer patient.

Case #8. E. W. This 40-year-old housewife had had a maxillary resection and exenteration of the right orbit for malignant melanoma in 1951. Local recurrence and neck node metastases had been, somewhat unexpectedly, controlled by roentgentherapy. An acute intussusception from metastatic melanoma had been elsewhere treated by resection in June 1953. Her previous physicians saw fit to tell the patient that she had incurable cancer and that her prognosis was hopeless.

The patient first consulted me in October 1953 because of recurrent abdominal pain and partial obstruction, due to further abdominal metastases. Although not known to me until later, her husband regularly conveyed to the patient everything I told him about her condition. *Yet*, the patient continued to visit me at regular intervals, underwent another bowel resection for intussuscepting metastatic melanoma, underwent palliative x-ray therapy to the spine and followed through a program of TEM medication with multiple blood transfusions before there was a sudden deterioration in her condition in November 1954, with death from cancer on December 5, 1954.

Comment. Although it would appear that I was the only one being fooled in this situation, I am certain that this patient remained under my care to the end because she was never told by me that her situation was hopeless and because in the positive therapeutic approach employed she found some solace during her last thirteen months of life.

SUMMARY

Although the time-honored manner of treating the patient with incurable cancer has heretofore been therapeutic abandon except for the prescription of increasing amounts of opiates, a more humane and modern approach would appear to be conscientious individualization of treatment in accordance with a clear understanding of palliation.

Palliative therapy is defined as that which will maintain and occasionally prolong life in relatively normal and comfortable fashion. In an effort to accomplish such palliation in a patient with incurable cancer, certain general considerations arise. These general considerations as well as certain specific problems which many incurable patients present, have been discussed and brief illustrative case reports appended.

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HYPERTENSION

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The good life expectation of the majority of patients with elevation of the blood pressure tends to obscure the high morbidity and mortality among those who have symptoms and signs referable to their raised arterial tension.

The essential mechanical factors in determining the level of the blood pressure are the cardiac output, the volume and viscosity of the blood, and the peripheral resistance. The latter is a function of the calibre of the arterioles, the pressure level being modified by the elastic recoil of the main arteries. Wood (1) has noted that hypertension may be mainly systolic or mainly diastolic, the upper limits of normal being 150/90 mm. of mercury. In view of the different factors involved in systolic and diastolic hypertension, use of the mean arterial blood pressure (M.A.B.P. = (systolic B.P. + diastolic B.P.)/2) is unsatisfactory.

Systolic hypertension. The ejection of blood by the left ventricle produces a wave of pressure throughout the arterial system. An increase in the systolic pressure follows exertion, emotional stress, administration of adrenergic drugs, and hyperthyroidism. Loss of elasticity due to arteriosclerosis results in a relatively benign systolic hypertension, although there is an increased strain upon the left ventricle and, in some patients, an insufficiency of peripheral blood flow.

Diastolic hypertension. The peripheral resistance to the arterial pressure is determined by the blood flow through the arterioles. Elevation of the diastolic level of the blood pressure follows sympathetic arteriolar constriction. A sustained level of diastolic hypertension is prejudicial to life. It is with this condition of *essential hypertension* that we have been primarily concerned, since drugs are now available which allow reduction in the levels of the blood pressure to an extent demonstrably greater than that obtainable by general methods of treatment.

CLASSIFICATION

In reviewing patients with hypertension, a system of classification is required. The several methods described of recording hypertension have all some limitations to their value. It was decided that a classification based upon disability, similar to the one proposed by the New York Heart Association (2) for functional capacity, was of greater usefulness, and patients were graded by clinical assessment of function, as follows:

Grade I. Minimal: Those having no symptoms referable to the hypertension, or symptoms, such as headache, which cause no incapacity.

Grade II. Slight: Those having slight dyspnoea on exertion and a tendency to early fatigue.

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Grade III. Moderate: Those whose activity was definitely restricted by fatigue and breathlessness on exertion.

Grade IV. Severe: Those with severe incapacity due to hypertensive cardiovascular changes.

One hundred millimetres of mercury diastolic pressure was the lowest level at which signs and symptoms of hypertension were observed, and, for the purposes of this survey, that was taken as the minimum level for diagnosis. The methods of assessment of the blood pressure recommended by the American Heart Association (3) were used.

PRESENTING SYMPTOMATOLOGY

Medical in-patients. Of the 5,794 patients admitted during the period 1950–1954 to the Royal Alexandra Infirmary, Paisley, 564 (190 males and 374 females) entered on account of hypertension, the distribution in grades of incapacity being as follows:

Grade of Incapacity	Males (%)	Females (%)
Minimal	10	10
Slight	27	33
Moderate	45	42
Severe	18	15

The percentage incidence of the presenting symptoms and signs is shown in Table 1. Dyspnoea and fatigue were the commonest symptoms, and the figures were similar to those for cardiac enlargement. Cerebral accidents were commoner in the female (27 per cent) than in the male (18 per cent), whereas congestive failure was commoner in the male (24 per cent) than in the female (17 per cent).

Medical out-patients. During the same period, 4,872 persons were examined for the first time in the out-patient dispensaries. Of these, 841 were found to have

TABLE 1

Percentage Incidence of Symptoms and Signs in Patients Admitted for Treatment of Hypertension

	Males (%)	Females (%)
Symptoms		
Dyspnoea and fatigue	71	81
Headache	30	51
Chest pain	12	13
Palpitations, tinnitus, epistaxis, cerebral vascular accidents, etc.	28	30
Signs		
Cardiac enlargement	73	82
Cerebral accidents	18	27
Congestive failure	24	17
E.C.G., left ventricle preponderance	54	58
Fundi, grades II and III	87	83

TABLE 2

Hypertensive Age Distribution

Age	Males		Females	
	No.	%	No.	%
Under 49	3	0.50	13	0.84
50–54	12	2.01	53	3.42
55–59	84	14.07	253	16.32
60–64	205	34.35	478	30.84
65–69	227	38.02	521	33.61
70+	66	11.05	232	14.97
Total.....	597		1,550	

a diastolic blood pressure of 100 mm. or over, with minimal-to-severe symptoms and signs of hypertension.

The incidence of dyspnoea and fatigue was found to be unrelated to the elevation of the diastolic pressure. The degree of disability tended to increase proportionately to the diastolic pressure; nevertheless, high levels of diastolic pressure were frequently found to be compatible with slight or moderate degrees of disability. However, the incidence of cardiac enlargement, demonstrated radiologically, increased in direct proportion to the elevation of the diastolic pressure.

Age incidence. The age distribution, at first examination, of the patients with benign essential hypertension (Table 2) has been included in the series recorded by Maxwell and Maxwell (4).

Obesity. Obesity was found in equal numbers of males and females under the age of 40; it was twice as common in females aged 40–50, and three times as common in the over-50 group.

MECHANISMS OF CONTROL OF THE BLOOD PRESSURE

The level of the blood pressure in the individual is predetermined by constitutional and hereditary factors. Thomas and Cohen (5) have defined the relationship of inheritance of hypertension to inheritance of the associated conditions of coronary artery disease, obesity and diabetes.

The normal blood pressure centres about the level of 80 mm. diastolic pressure, and in the determination of this mean, there is a proportion of the population with higher diastolic pressures constituting essential or benign hypertension. Merrill (6) has suggested that the centre is in the hypothalamus, control being exerted in part by influence upon the secretion of hormones by the anterior pituitary, with action upon adrenal cortex; also through the medullary centres controlling the heart rate and response to body requirements. An emergency mechanism is recognised of adrenal secretions in response to emotions resulting in an increase of cardiac output and systemic blood pressure. There is a reflex mechanism of control of the pressure level by the carotid sinus, dilation of which, by a rise in blood pressure, stretches receptor organs within its wall, stimulating vagal activity to lower the arterial pressure. Similar receptor organs are found in

the aorta and major arteries, and interference with these may be followed by hypertension.

Renal control exists, since a filtration head of pressure is required at the glomerulus for dialisation. Insufficient pressure in the afferent arterioles was found, in the renal ischaemia experiments by Goldblatt *et al.* (7), to be followed by the secretion of pressor substances.

Renal hypertension. Hypertension is a common occurrence in anomalies of the kidney. Chronic pyelonephritis is probably a frequent cause of hypertension, in females particularly. Wilson (8) has described the involvement of chronic glomerulonephritis. When renal disease is unilateral, there exists the possibility of treatment by nephrectomy.

Carotid sinus. Arteriosclerotic changes may involve the carotid and aortic stretch receptors, and thus disturb this mechanism for regulation.

Adrenal medulla. Tumours of the adrenal medulla and of ectopic chromaffin tissue may induce hypertension by secretion of adrenaline and/or noradrenaline. The hypertension is usually paroxysmal but may become fixed.

Adrenal cortex. The observation of Cushing (9) upon basophil adenoma of the anterior hypophysis with cortical stimulation led to the implication by Merrill (6) and others, of the pituitary-adrenal axis in the production of hypertension. Page (10) has observed that, in the animal, administration of desoxycorticosterone acetate results in hypertension resembling most closely the benign type in man. Sodium accumulation at specific receptors following administration of blocking drugs has been described by McDowall and Soliman (11), and it is possible that desoxycorticosterone exerts an action upon cellular sodium metabolism.

Stress. The studies by Bechgaard (12) have shown an increasing rise in the diastolic pressure with age. However, Kean and Hamill (13) found that this rise does not appear to occur among the primitive tribes they examined, and they were tempted to suggest that the stresses of civilisation are reflected in the development of hypertension. Certainly during the stress of prolonged periods of warfare in North Africa, transient hypertension occurred, as Graham (14) has described. Gavey (15) provided an indication that, under circumstances of long-continued stress, rises which are at first transient, may become permanent. It is possible that part of the hereditary predisposition may be an inherited reaction to environment. Wolf *et al.* (16) found that there was a high incidence of obsessive compulsive traits and subnormal assertiveness among patients with hypertensive vascular disease. The reactions of these patients to the threats and challenges of everyday life was suggested by Gressell *et al.* (17) as a restrained aggression with a vascular component of elevation in the blood pressure and renal vasoconstriction. Merrill (6) has attributed development of essential hypertension to psychic stimuli with adrenal activity in response to hypothalamic stimulation.

METHODS OF TREATMENT

Our clinical experience has indicated that *the development of symptoms and signs appears to depend upon the ability or otherwise of the individual patient's cardiovascular system to sustain the load of the hypertension.* Treatment must be

directed therefore primarily to ease the strain upon the failing heart. Renal involvement and cerebrovascular disorders occur late in the disease, and are not amenable to other than palliative treatment.

Heart Failure

In the first instance, application of general and proved measures is of undoubted value.

Rest. An initial period of rest in bed is desirable, the duration depending upon the degree of failure, with subsequent restriction of activity.

Diet. Fishberg (18) has stated that reduction in the dietary intake is followed, after one to two weeks, by a fall in the basal metabolic rate. Maintenance of the rate at a lower level reduces the load upon the heart to an extent sufficient to control the signs and symptoms of many patients with moderate elevation of the diastolic pressure. Severe dietary restriction, such as the rice-fruit-sugar diet introduced by Kempner (19), is almost impossible to sustain. We have found the milk diet prescribed by Karell (20), modified to consist of an intake of 600 ml. of water and 600 ml. of milk per day with up to 200 grams of glucose, of value during the initial three or four days of treatment. This is followed by an 800-calorie diet, the salt content of which is less than 2 grams per day, achieved by avoidance of added salt in cooking and at table. Sodium-free salt substitutes may render the diet more acceptable.

Weight reduction is especially indicated in the treatment of obese hypertensive patients. Although Martin (21) has shown that reduction of obesity is not followed by a significant fall in the blood pressure, an improvement in physical status occurs.

Further measures. Digitalis is indicated if there is venous congestion. Mercurial diuretics may be necessary in the presence of oedema. Coronary artery ischaemic changes may require appropriate treatment. Severe failure in obese plethoric polycythaemic patients is benefited by repeated venesection.

Paroxysmal Nocturnal Dyspnoea

The occurrence of this serious indication of left ventricle failure requires immediate application of the foregoing methods of treatment, after control of the attack by injection of morphine and aminophylline and inhalation of oxygen. Successful control of hypertension generally results in freedom from further attacks.

Relief of Stress

Environmental stress, or mental factors, causing or aggravating the hypertension may be apparent. In some cases they are not obvious, as the patient may be leading a normal life. Recognition and modification of stress results in improvement. It is generally the responsibility of the physician to determine the stress factor, and provide advice. Psychiatric assistance is required rarely.

Awareness of the diagnosis of hypertension often arouses a state of concern in the patient. Reassurance is indicated, and the patient should be encouraged to fix his thoughts upon observing instructions regarding treatment rather than upon

the level of the blood pressure, the fluctuations of which will induce continuous anxiety.

Sedation is useful and is sufficient, in itself, for the treatment of the milder cases. Barbiturate drugs are generally needed, and of those available, phenobarbitone, in dosage of up to 1 grain three times daily is probably the best. Occasionally it is not tolerated well in sustained dosage. Sodium amytal in dosage of up to 3 grains three times daily is the barbiturate of choice in the treatment of patients in bed during initial observation; the dosage may be subsequently reduced to ½ or 1 grain thrice daily.

Reduction in the Level of Blood Pressure

Several drugs are in use at present for the treatment of hypertension, and others are undergoing investigation. For convenience, they may be divided into two groups, synthetic and alkaloid, as shown in Table 3.

Hexamethonium. Paton and Zaimis (22) described the pharmacological action of

TABLE 3

Hypotensive Drugs used in the Current Treatment of Hypertension

Synthetic

Drug	Formula	Site of Action
Hexamethonium	1:6-Bistrimethylammonium dibromide (subsequently chloride and tartrate salts)	Ganglion-blocking agent
Pentolinium "Ansolysen"	Pentamethylene-1:5 bis(1-methyl-pyrrolidinium) hydrogen tartrate	Long-acting ganglion-blocking agent
Su 3088 "Ecolid"	4,5,6,7-Tetrachloro-(2 dimethylaminoethyl)-isoindoline dimethochloride	Long-acting ganglion-blocking agent
Ro 2-2222. "Arfonad"	*d*-3,4(1′,3′ - Dibenzyl - 2′ - ketoimidazolido)-1,2-trimethylene thiophanium *d*-camphor sulphonate	Short-acting ganglion-blocking agent. Peripheral vasodilator
Hydralazine	1-Hydrazino-phthalazine hydrochloride	Central depressant. Peripheral vasodilator. Antagonist to angiotonin, serotonin, pherentasin

Alkaloid

Source	Drug	Site of Action
Rauwolfia	Reserpine	Central depressant
Veratrum	Veriloid	Central depressant
	Protoveratrine	Peripheral vagal stimulant
Ergot	Dihydroergocornine	Central depressant
	Dihydroergocristine	Peripheral adrenergic block
	Dihydroergokryptine	

the methonium series of compounds. Hexamethonium was found to be very active in blocking sympathetic ganglia. A pronounced fall in the blood pressure of normotensive and hypertensive patients following injection of this drug was demonstrated. It has been used extensively since then in the treatment of hypertension. The fall in blood pressure induced by administration of hexamethonium is abrupt; postural hypotension is marked and may cause sudden syncope. There is a generalised ganglion blockade, with inhibition of gastro-intestinal motility, in some cases leading to the danger of ileus. When administered by mouth, its action is inconsistent, owing to wide variation in absorption. During the last two years we have preferred to use the newer ganglion-blocking agents.

Pentolinium. A search for improved ganglion-blocking agents has been described by Maxwell and Campbell (23), resulting in the selection of pentolinium as offering advantages over hexamethonium. Pentolinium is a much more active drug than hexamethonium, inducing a fall in blood pressure in one-fifth to one-tenth of the dosage. In common with other ganglion-blocking agents, there is a wide variation in individual susceptibility, and tolerance develops during sustained administration. However, inhibition of gastro-intestinal motility is less marked, and no case of ileus has been reported. Interference with postural reflex control of the blood pressure is less marked, so that excessive dosage is manifested by vertigo and nausea instead of sudden syncope. Pentolinium is more consistent in action than hexamethonium, and it is active in a higher proportion of patients when administered orally.

Su 3088. The first clinical application of this new drug was by Grimson *et al.* (24). It is active by mouth in dosage of 25 mg.–150 mg. daily of the chloride salt, the dose being administered before breakfast. The duration of action is long, the maximum hypotensive effect occurring two hours after ingestion, with a useful depression of the blood pressure being maintained for eight to twelve hours. Side effects are more marked than with pentolinium; blurring of vision is often severe, and there may be an unpleasant dryness of the mouth. The drug causes inhibition of gastro-intestinal activity, requiring care to avoid the possibility of ileus. However, Su 3088 has a greater consistency of action by the oral route, with a longer duration of action than previous drugs, and we have found it useful in several patients with severe hypertension, as recorded by Maxwell and Howie (25).

Ro 2-2222: (*"Arfonad"*). The short-acting ganglion-blocking agent "Arfonad" has a probable place in the induction of controlled hypotension for the immediate treatment of hypertensive encephalopathy and paroxysmal dyspnoea, in which conditions administration of methonium compounds may cause precipitate fall in the blood pressure. Hoobler (26) has noted these indications for its administration. The drug may be used in 0.2 per cent concentration in 5 per cent dextrose continuous intravenous infusion; or, alternatively, 10–30 mg. intravenous doses may be given at fifteen-minute intervals until a moderate fall in blood pressure occurs.

Hydralazine. Compounds of the phthalazine series induce a slow depression of the blood pressure of long duration, together with an increase in renal blood flow;

they also have antiadrenergic activity. Clinical investigations of 1-hydrazinophthalazine were conducted by Schröeder (27) and others. Combined therapy with hexamethonium has been practised, using hexamethonium to induce a marked fall in the blood pressure and 1-hydrazinophthalazine to sustain the effect and regularise the variations in pressure which occur during methonium treatment.

During limited investigation in this hospital, little place was found for 1-hydrazinophthalazine in treatment. The side actions in the form of headache, nausea and tachycardia proved troublesome. No significant advantage was found in combining 1-hydrazinophthalazine with hexamethonium, as it had little effect upon the blood pressure, and newer compounds of the ganglion-blocking series were available.

Reserpine. The shrub, *Rauwolfia serpentina*, found in India and South East Asia, was long reputed to have medicinal value. Alkaloids were extracted from its root in 1931, and Bhatia (28) reported favourable results in the treatment of hypertension, the study being extended by Vakil (29). The pure alkaloid, reserpine, was extracted by Mueller *et al.* (30). There have been many publications upon the use of this drug in the treatment of hypertension. Reference may be made to the Annals of the New York Academy of Sciences (31), in which its pharmacology is comprehensively dealt with. The site of action appears to be the hypothalamus, and hypotensive action is associated with relief of mental stress.

In dosage of 1–2 mg. daily by mouth of the pure alkaloid, the drug is safe to use, having a minimum of side actions. These may consist of drowsiness, fatigue, bradycardia, flushing, nasal congestion, vomiting and diarrhoea; sometimes, euphoria; and sometimes troublesome apathy and depression. The incidence of these side actions is high during induction of treatment, but they are seldom incapacitating, and disappear generally if dosage is temporarily reduced. Basing his opinion upon sixteen years of experience, Vakil (32) claims a useful hypotensive action in two-thirds of patients treated.

We consider that, before using more active hypotensive drugs, the response to reserpine should be determined when a fall in blood pressure is required. The combined sedative and mild hypotensive action of this drug results in a slow fall in the blood pressure in the majority of out-patients with a slight or moderate degree of incapacity. The fall usually reaches its maximum in a few weeks, and is well sustained. A more rapid fall over a few days usually occurs when the drug is used in the treatment of hospitalised patients.

Reserpine is unpredictable in its action. The effect upon the blood pressure does not depend upon the severity of the hypertension, and it is by no means directly related to the dosage employed. Whereas some patients are resistant from the beginning, many others become tolerant after a period of weeks or months of treatment. The prophylactic use of reserpine in the minor grades of hypertension is probably, therefore, of limited value.

Veratrum alkaloids. The pharmacological actions of veratrine and alkaloidal extracts of green hellebore (*Veratrum viride*) have been known for many years. The proprietary preparation, Veriloid, causes a depression of the blood pressure by a central depressant action upon the hypothalamus; also, by stimulating the

vagal peripheral sensory receptors, it induces bradycardia and peripheral vasodilation. It has no adrenergic blocking properties. The main side effect is nausea and vomiting, brought about by irritation of the gastric vagus. It has been used extensively in the treatment of hypertension, and recently it has been used in combination with reserpine. During investigation of this drug, we found that a marked hypotensive action could be obtained in some patients, but the effect upon the blood pressure was accompanied by nausea and occasional vomiting. The purified extracts now becoming available may be more useful.

Hydrogenated alkaloids of ergot. The alkaloids of ergot are known for their constrictor action on smooth muscle and their production of vasoconstriction. The hydrogenated alkaloid which they contain in small quantity has an antiadrenergic action, which is obscured by the main activity. A mixture of three hydrogenated alkaloids of ergot has been employed in the preparation Hydergine. Hydergine has some central depressant action, but its main activity is vasodilation. Experience with this drug has indicated that the fall in blood pressure was seldom adequate for the treatment of hypertension. Nausea and headache were found to be troublesome side actions.

Combined dosage of hypotensive drugs. Since the sites of action of some of these drugs are different, combinations of two have been used in an attempt to obtain an additive or synergic effect. Hexamethonium has been combined with hydralazine, with Veriloid, and with reserpine; and Veriloid with reserpine. Of the possibilities available, we have found that the combination of pentolinium and reserpine is the most useful. In most cases, treatment is commenced with reserpine, in oral dosage of 1–2 mg. per day. If the fall in blood pressure is insufficient by the end of one to two weeks, pentolinium by mouth is commenced. Initially 20 mg. twice daily is given. This dosage is increased until satisfactory control of the blood pressure is achieved; the final dosage may be from 60 mg. to 500 mg. daily. Smirk *et al.* (33) and Bain *et al.* (34) have described this method. The combination with reserpine allows a smaller dosage of pentolinium to be used, and the blood pressure fluctuates less with this than with the ganglion-blocking agent alone.

Recently we have obtained satisfactory results from combined dosage of Su 3088 and reserpine, the dosage of Su 3088 for satisfactory pressure control being 25–150 mg. twice daily. Continued administration of this new ganglion-blocking agent requires special care to avoid constipation.

Surgical Methods of Treatment

Sympathectomy. Prior to the introduction of the methonium compounds in 1949, sympathectomy was the only practical method of reducing the blood pressure of patients with severe hypertension, by interruption of the sympathetic control of a major portion of arterioles. The pioneers were Leriche, Grimson, Smithwick, Peet and Adson. The trend latterly was to restrict the operation to hypertensive patients who had not suffered cardiac, renal or fundal changes. Recently it has been suggested that interest in sympathectomy should be revived. However, the frequency with which this surgical procedure has been employed

has diminished markedly since the introduction of ganglion-blocking agents, which have an identical action. Many patients experience a recurrence of hypertension following sympathectomy and require drug treatment.

Adrenalectomy. Adrenalectomy itself has had insufficient effect upon the blood pressure, and is generally combined with sympathectomy. The results recorded by Jeffers *et al.* (35), who performed a total or subtotal adrenalectomy, combined with an Adson-type sympathectomy, indicate the gravity of this procedure and the mixed results obtained. Chasis (36) is of opinion that it is a desperate manoeuvre for desperately ill patients.

Nephrectomy. Rarely, hypertension is due to unilateral renal disease, and Pickering and Heptinstall (37) have recorded successful results following excision of the diseased kidney. Although the incidence of this type of hypertension is small, it must be excluded, since there is a possibility of cure. We have treated one patient, in whom identification of a unilateral renal artery anomaly, followed by nephrectomy, led to remission of the hypertension. Smith (38) has concluded that nephrectomy should be restricted to the relief of unilateral renal disease amenable to operation, and not performed with hypertension as the indication. In advanced hypertension, nephrectomy may shorten life by reducing further the remaining functional renal tissue.

INDICATIONS FOR TREATMENT

Group I. In view of the probably favourable prognosis in asymptomatic benign hypertension, no active treatment appeared to be indicated in most of our patients, reassurance and sedation proving adequate. A few patients below the age of 40 years presented with diastolic pressures over 120 mm.; and some others, over 140 mm. Modification of their pressure levels was effected.

Group II. Slight breathlessness on exertion and a tendency to early fatigue responded well to reassurance and sedation, with some restriction of activity and treatment with reserpine.

Groups III and IV. The patients in these groups were admitted to the hospital. One hundred and seventy-nine patients were treated with methonium compounds. There were two indications for the use of these compounds: 1) The presence of moderate or severe incapacity, and failure of the diastolic pressure to fall below 100 mm. within a fortnight or more in response to general measures of treatment. The range of initial pressure levels varied widely in the groups, as hypertension tends to be reduced when failure occurs. In the moderate cases, the pressure was often labile, responding well to rest and sedation during the first admission, but within months or years tending to become fixed, so that subsequently methonium became indicated. 2) High levels of diastolic pressure (in excess of 140 mm.) accompanied by acute complications, such as blindness, encephalopathy and heart failure, constituted an indication for immediate treatment with methonium compounds.

Angina is not a contraindication to methonium administration. It is unwise to lower the blood pressure if recent cerebral thrombotic incidents have occurred, since extension of thromboses may take place. Methonium compounds are of

value when congestive heart failure has occurred, as there is also a fall in the venous pressure. Harington and Rosenheim (39) have noted sustained relief in pulmonary oedema. These compounds must be used with care in the presence of extensive renal damage, which may be increased by excessive pressure reduction. This is not a contraindication to their application, as modification of the pressure level may prevent further ischaemia and relieve spasm.

Systolic hypertension. The elevation of the systolic blood pressure is mainly compensatory; modification of its level is infrequently required. However, some patients present with left ventricular strain, and reduction in the peak levels of pressure is desirable. Reserpine is useful for this purpose, and it may be combined, if need be, with a ganglion-blocking agent in small oral dosage.

RESPONSE TO TREATMENT

Reduction in the diastolic blood pressure is attended by marked improvement in the symptoms and signs. We have examined the results obtained by methonium therapy (Graham and Maxwell (40)). Comparable results have been obtained with the other drugs available. There has been relief from headache and improvement in exercise tolerance, while heart size has diminished, electrocardiographic abnormalities have improved, and fundal haemorrhages and exudates have become organised.

With the introduction of pentolinium, it has been possible to control the blood pressure of hospitalised patients at normal levels. Subsequent out-patient treatment is much more difficult. Restoration of activity is followed by a rise in the blood pressure. High dosage of drugs, for purposes of control, is not well tolerated, as hypotensive episodes occur. Most out-patients require supervision at week-to-month intervals, with careful regulation of dosage. Tolerance develops to all the drugs available, but treatment may be continued by intermittent dosage, withdrawal of the drug for a month or two, then recommencing with smaller dosage. Different drugs may be alternated. Combined therapy orally with pentolinium and reserpine is the best method available at present. It is probably less important to effect major pressure reductions in out-patients than to retard the progress of the disease by moderate pressure reduction. However, the gravity of prognosis in severe hypertension is illustrated by survey of the patients in Groups III and IV. After leaving the hospital, 47 per cent of the males died within an average of nineteen months, and 35 per cent of females within an average of twenty-three months. Cerebral vascular accidents accounted for 30 per cent of female, and 19 per cent of male deaths; heart failure was more common in males (44 per cent) than in females (35 per cent); and renal failure occurred in 13 per cent of males and 14 per cent of females.

MALIGNANT HYPERTENSION

In 1928, Keith and Wagener defined malignant hypertension as characterised by severe hypertension and fundal changes in the form of haemorrhages, exudates, alterations in the appearance in the retinal arteries and, essentially, papilloedema. Despite early recognition of the malignant phase of hypertension, the study by

Keith *et al.* (41) furnished the first recognition of the association of papilloedema with rapidly fatal hypertensive disease.

Despite its relatively infrequent occurrence, malignant hypertension has attracted attention because progress is often rapid, changes taking place in weeks or months which may require years in patients with benign hypertension. The vascular response is different; an acute arteriolitis occurs due to the rapid rise in pressure, in contrast to the arterial fibrosis and arterial fibrinoid change of essential hypertension. Although some patients die from cerebrovascular catastrophes or heart failure, renal failure is common.

In the clinical studies from which data have been accumulated, it has been especially difficult to determine the prognosis in this group. In many, the disease progresses to a fatal termination within a few months. In some young patients, apparently having the disease in the acute form, life has extended to several years. Several patients have had spontaneous remissions, with disappearance of papilloedema, and some have enjoyed a normal duration of life.

During the last four years, 16 patients have been treated in this hospital with methonium compounds. This number has been just sufficient to afford an analysis of the response to treatment, and to suggest subdivision of patients with malignant hypertension into two main groups, the second of which may again be divided.

In 8 of the patients, the malignant phase followed hypertension of many years' duration, as shown by history and observation at home and during hospital investigation. These patients tended to be of a rather older age group, the ages ranging from 39 to 59 years. The heart was found to be enlarged clinically and radiologically in response to the load imposed by chronic hypertension; electrocardiographic changes showed left ventricular strain and hypertrophy. Vascular changes of sclerotic type were present, renal function was good, and albuminuria infrequent. The fundi showed retinal arteriosclerosis, and a late picture of waxy hyaline exudates, with chronic papilloedema. Fresh haemorrhages and wooly exudates were observed at some point during the course of the disease, and tended to resolve during treatment. Papilloedema regressed during treatment also, but optic atrophy tended to be progressive. These patients generally presented with signs and symptoms due to cardiac failure. Their response to treatment with hypertensive drugs was good, and the prognosis extended to over four years. To this group, the term "malignant phase" was applied, in that these patients had had hypertension for several years, and their pressure had risen slowly to unsupportable levels. The cardiovascular system had been reinforced and renal insufficiency would be an uncommon form of death. Treatment of this group by general measures of rest and sedation, together with, if possible, some reduction in the pressure level by hypotensive drugs, was followed by an indeterminate period of life expectation.

In the second group, in which the patients were generally younger, severe hypertension was of recent onset. No evidence of arteriosclerosis was present, and cardiac enlargement was not demonstrable during initial examination, but occurred in some cases after several months. The fundi showed fresh haemor-

rhages and woolly exudates with papilloedema. This group included 4 patients with a history and renal changes suggestive of glomerulonephritis and pyelonephritis. This was confirmed at postmortem examination. Four patients had no history of renal disease, showed no evidence initially of renal impairment, and were found to have postmortem changes consistent with a diagnosis of malignant hypertension. All the 8 patients in this group died in uraemia, with a marked hypochromic anaemia. This response to treatment confirmed the indication for subdividing this group into those with renal disease and those with primary malignant hypertension. The 4 patients with hypertension of renal origin were treated repeatedly with hexamethonium or pentolinium, with restoration of normal levels of pressure. Two died from progressive renal failure, three and four years respectively after the first examination, and 2 after five years.

The response of the patients with primary malignant hypertension was disappointing. This group presented with gross visual impairment. Symptomatic relief followed restoration of the blood pressure in all cases to normal levels by intensive application of ganglion-blocking drugs. However, despite control of the blood pressure, renal failure was progressive, the 4 patients dying within eight and twelve months.

DISCUSSION

In essential hypertension, there may be a constitutional tendency for a slow rise in the diastolic pressure over a period of many years, with a benign course which does not diminish the life expectancy of the majority of patients. The inherited factor may be a vascular response to stress, with transient elevations of the blood pressure, due to an adrenal reaction. Repetitions of these periods of hypertension lead in some to the pressure level being reset by a more basic mechanism, such as the pituitary-adrenal axis, at a higher level. This higher take-off in diastolic pressure, in turn, introduces a vicious circle of increasing hypertension. Alternatively, and perhaps simultaneously, sclerosis of the aortic and carotid stretch receptors may impair the reflex mechanism of regulation.

Whatever the aetiology, the hypertension is sustained by the peripheral arteriolar resistance, as effective ganglion block causes a fall in pressure. Support for the postulate of a vicious circle is given by the response to hypotensive treatment, in that, if the pressure is reduced to normal levels for a period, and the drug withdrawn, a rise in pressure may be delayed.

The maintenance of hypertension is complicated by hormonal, renal and cardiac factors. In some, it is self-limiting, in that, with cardiac failure, the hypertension is not sustained. Indeed, a high diastolic pressure and a low pulse pressure are indicative of poor prognosis.

Whatever the mechanisms involved, hypertension presents a necessity to lower the blood pressure when cardiovascular strain is evident. Review of the results of sympathectomy shows that it was a useful, if limited, procedure, but it has been superseded by more effective methods of medical treatment. It was not until 1950 that hexamethonium became available as a reasonably certain method of reducing the blood pressure. This in turn has been supplanted by

improved drugs, and the present combination of the ganglion-blocking agent, pentolinium, with the alkaloid reserpine, administered orally, is fairly satisfactory in delaying advancement of hypertension. However, control of hypertension has not been accomplished to the satisfactory state of being able to record blood pressure observations within normal limits over a period of time. The attention which is being given to production of new drugs may eventually be rewarded by better control of hypertension; and studies of the aetiology, and investigations of the mechanisms, may lead to prevention and cure.

SUMMARY

It is necessary to distinguish between systolic and diastolic hypertension because of the differences in aetiology, prognosis, and indications for treatment. In many patients with elevation of the diastolic blood pressure, heart failure develops and the expectation of life becomes limited. The first consideration in treatment is relief of heart strain by rest, sedation, weight loss, salt-poor diet, and restriction of mental and physical activity. If these measures prove inadequate, hypotensive drugs are required. Reserpine should be tried first; if it is insufficiently active, pentolinium by mouth should be administered also. Treatment with hypotensive drugs is beneficial in the majority of patients, but is not without difficulties. Improved methods are still necessary.

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ROLE OF INACTIVITY IN PRODUCTION OF DISEASE—HYPOKINETIC DISEASE

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Follow-up studies in the field of therapeutic exercise have convinced us that many orthopedic disabilities and neuromuscular tension syndromes are due to under-exercise (1–4). The mechanized way of our lives has created the "substrength individual" (5, 6) who, at the same time, becomes the "supertense person." A survey of school children has shown that over half of our population grow up in this deficiency state (4).

We have found that the substrength individual compares to the well exercised one as follows: The physically active person has low neuromuscular tension, low absolute and relative weight, low blood pressure, low pulse rate, greater adrenocortical reserve (7), greater muscle strength and flexibility, and greater vital breathing capacity. The physically inactive person shows signs and symptoms of aging earlier in life. He exists physiologically at a lower potential and is less well equipped to maintain homeostasis and to meet the stress of daily living. This low level of function combined with enforced suppression of the "fight and flight" response (8) enhances the incidence of disease.

We shall precede a report of our own observations with a brief review of conditions prevalent (hypokinetic disease) in the physically inactive.

In an analysis of death and disease among certain professions in England Morris (9, 10) concluded that the incidence of death from coronary heart disease was doubled among the physically less active (Fig. 1) and that once coronary heart disease did strike, sudden death occurred much more often among the less active.

Other hypokinetic diseases more prevalent in the inactive groups are duodenal ulcer and diabetes (Fig. 2) (10).

Exercise, both general and specific, is of great therapeutic value in many internal diseases. In diabetics it is well known that steady physical activity greatly reduces the insulin requirement. That it is possible for diabetics to maintain even strenuous physical activity has been amply demonstrated by several athletes prominent in the scene of sports.

In the field of respiratory disease, therapeutic exercise has been found to be of value in the control of bronchial asthma, in the recovery stage of tuberculosis, and in the improvement of pulmonary function of patients with pulmonary emphysema.

The interaction of physical fitness and emotional stability was demonstrated

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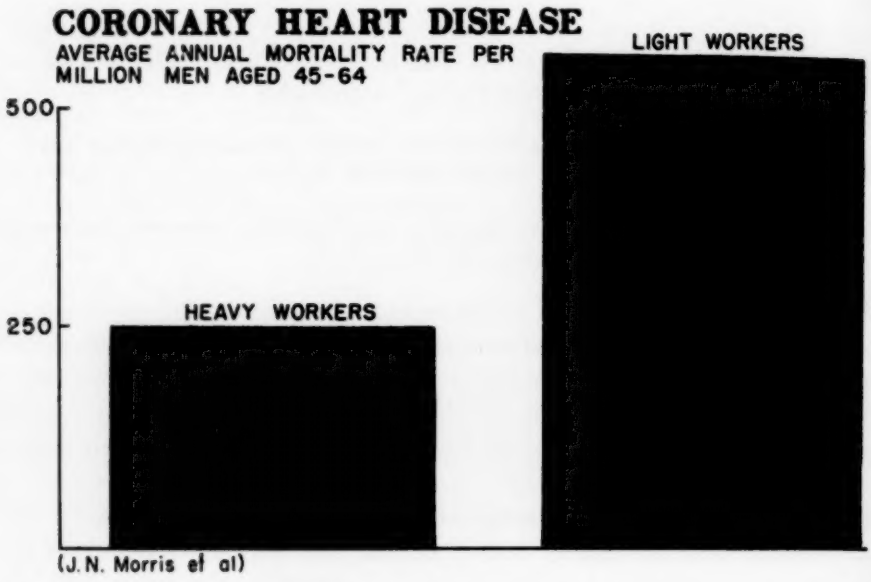

FIG. 1. Average annual mortality rate from coronary heart disease per million men aged 45–64, classified according to heavy and light workers. (Adapted from J. N. Morris *et al.* (9, 10).)

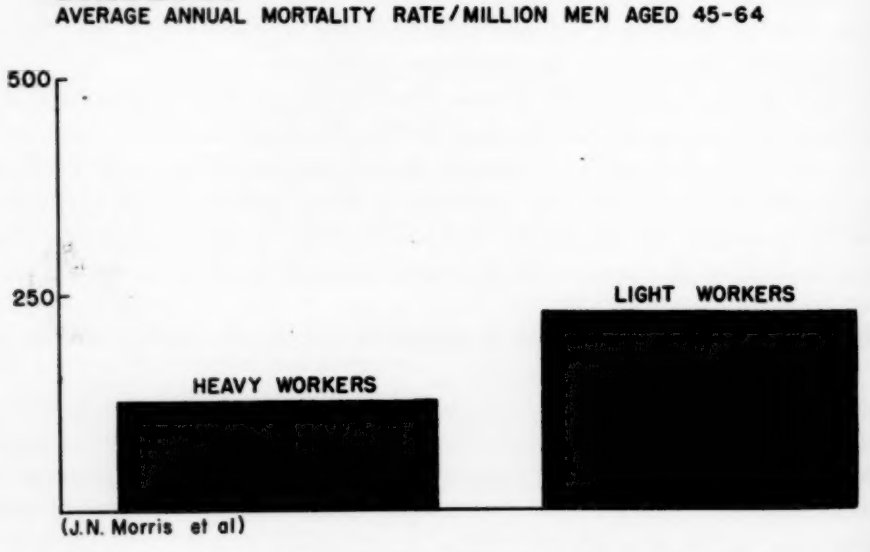

FIG. 2. Average annual mortality rate from diabetes million men aged 45–64, classified according to heavy and light workers. (Adapted from J. N. Morris *et al.* (9, 10).)

in a recent study by Appleton at West Point (11). Among the least physically fit group of cadets, 14 per cent either required psychiatric help or received psychiatric discharges (Fig. 3). No psychiatric difficulties were encountered in the most physically fit.

The effect of the inhibited "fight and flight" reflex on local muscle tension and the mechanism by which this inhibition brings about orthopedic conditions,

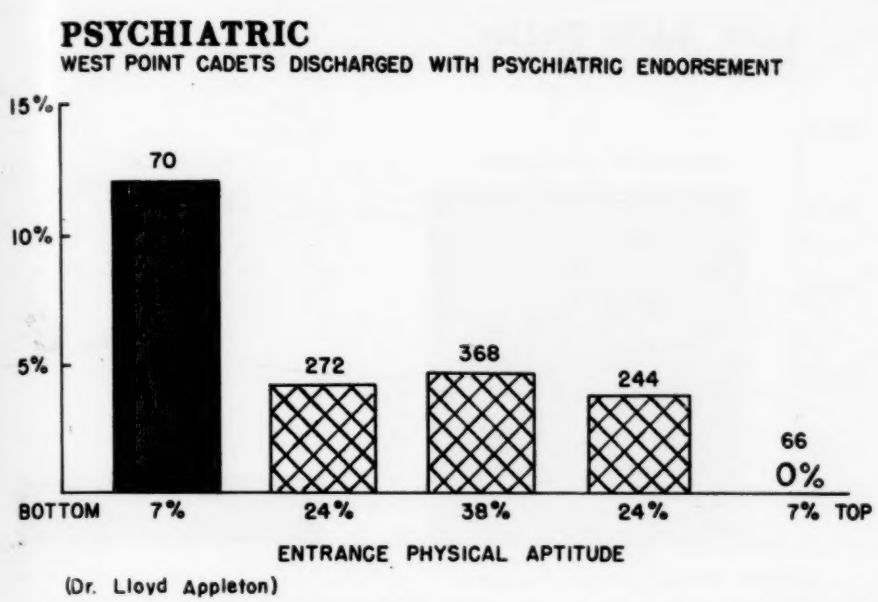

FIG. 3. Psychiatric discharges among West Point cadets correlated with physical fitness on entry. (Adapted from Appleton (11).)

such as a painful stiff neck, shoulder and back, can be well understood from the findings of a recent study by Sainsbury *et al.* in which the authors investigated the action currents of painful stiff muscles. When interviews with the patients caused anxiety or irritation, pain occurred in their particular target areas, as well as a marked increase in electromyographic activity.

COMPARATIVE STUDY OF MUSCLE STRENGTH

In clinic for low-back symptoms

The fact that lack of physical activity may lead to, or contribute to disease was first called to our attention (2, 3, 13–16) when evaluating and treating patients in a clinic for low-back symptoms. The aim of this group clinic, which included all the necessary specialties, was to evaluate and investigate the cause for increasingly frequent backache. We found that approximately 80 per cent of our patients were free from organic disease but failed to pass six simple exercise tests for strength and flexibility of key posture muscles (Fig. 4). When put under a regimen of corrective exercises to increase muscle strength and/or flexibility, these patients lost their back pain as their muscular strength and flexibility improved. Over 5,000 cases of low-back pain were studied from this point of view. Of this number, 3,000 were patients in the Columbia-Presbyterian Medical Center Low Back Clinic; the others were in the Low Back Service of the Institute of Physical Medicine and Rehabilitation of New York University-Bellevue Medical Center, as well as in private practice. Most of these patients showed a combination of the previously mentioned muscle deficiencies and nervous tension, although their complaint was only of back pain. These were not healthy people suffering from a local difficulty, nor were they simply neurotics

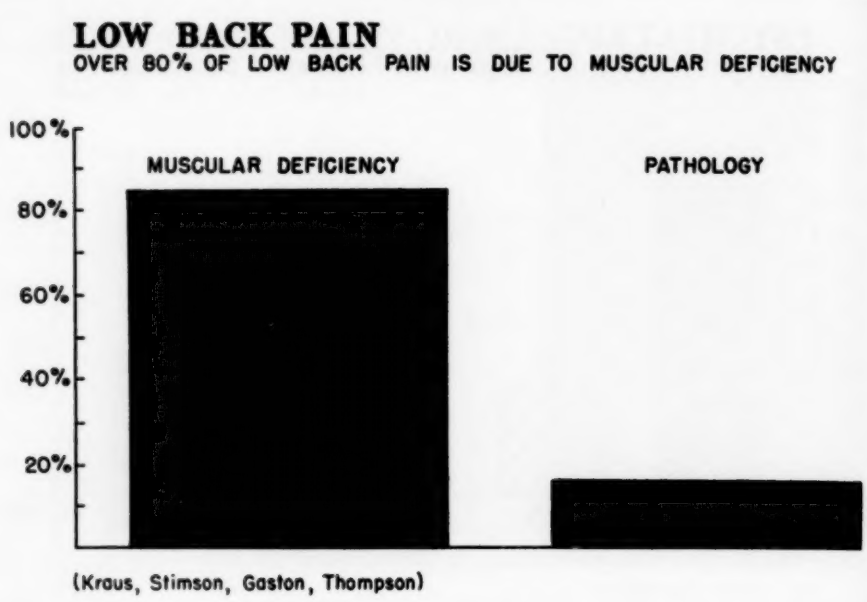

FIG. 4. Over 80 per cent of low back pain is due to muscular deficiency. (Adapted from Kraus (1–4), Stimson (14), Gaston (13) and Thompson (16).)

somatizing their emotional complaints. They presented a combination of both physical and emotional difficulties. Their back strain, either acute or chronic, merely designated a target area for a much deeper and more complex disease and deficiency state resulting from lack of exercise. It should be emphasized that there was a direct correlation between improvement in muscular status and relief from backache (3). As their physical activities were reduced, their complaints returned and again were dispelled by a resumption of regular exercise. The follow-up evaluation of muscle status in these patients was carried out by a series of simple muscle tests.

Kraus-Weber tests for minimum muscular fitness (Fig. 5, a and b): *a*. Position: Lying supine, hands behind neck. Examiner holds feet down on table. Command: "Keep hands behind neck, roll up into a sitting position."

Position: Lying supine, hands behind neck and knees bent. Examiner holds feet down on table. Command: "Keep hands behind neck and roll up into a sitting position."

Position: Supine with hands behind neck and legs extended. Command: "Keep your knees straight and lift feet ten inches off the table for ten seconds."

b. Position: lying prone, with pillow under abdomen, hands behind neck. Examiner holds feet and hips down. Command: "Raise trunk and hold for ten seconds."

Position: Prone over pillow. Examiner holds back and hips. Command: "Lift legs up, hold for ten seconds."

Position: Standing erect in stocking or bare feet, hands at sides. Command: "Put your feet together, keep knees straight, lean down slowly, see how close you can come to touching the floor with your finger tips."

Since the number of these "muscular low back" patients is constantly on the increase and since our experience indicates that most of them could have prevented their trouble by maintaining a minimum level of physical fitness, we be-

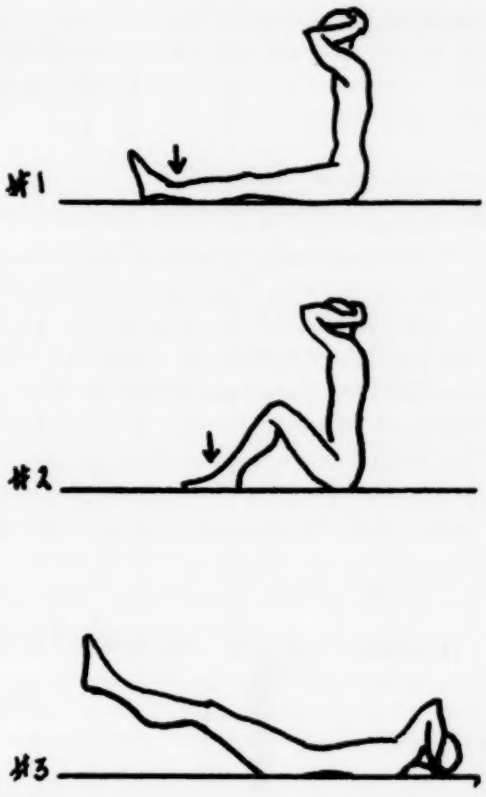

FIG. 5. (a) Kraus-Weber tests for minimum muscular fitness. For explanation, *see* text

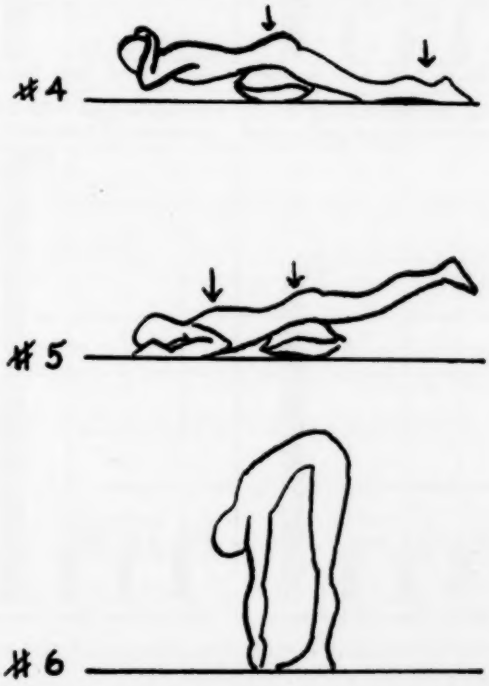

FIG. 5. (b) Kraus-Weber tests for minimum muscular fitness. For explanation, *see* text

came interested in gauging the muscular fitness of our population. Such a survey seemed all the more timely because our clinical findings coincided with the increasing quota of draft rejections and the increasing state of emotional instability in large sections of our population.

American versus European school children

We found that American school children subjected to these tests proved to be greatly inferior to children in physically active European communities. Approximately 20,000 children in Eastern Seaboard areas have been tested to date. Another 20,000 have been examined in states as far west as Texas and Minnesota. We have so far published figures on 4,269 American and 2,870 children (2, 4) tested in less mechanized European countries (Figs. 6 and 7). The children we tested in this study were between the ages of 6 and 16 years. Both groups were from public school systems in suburban and urban communities of comparable size. Every effort was made to keep test conditions identical and to make the tests uniform. All tests were made by the authors themselves and were completely standardized. Statistics obtained from sick or disabled children were excluded from the results. The children were from comparable socio-economic groups in

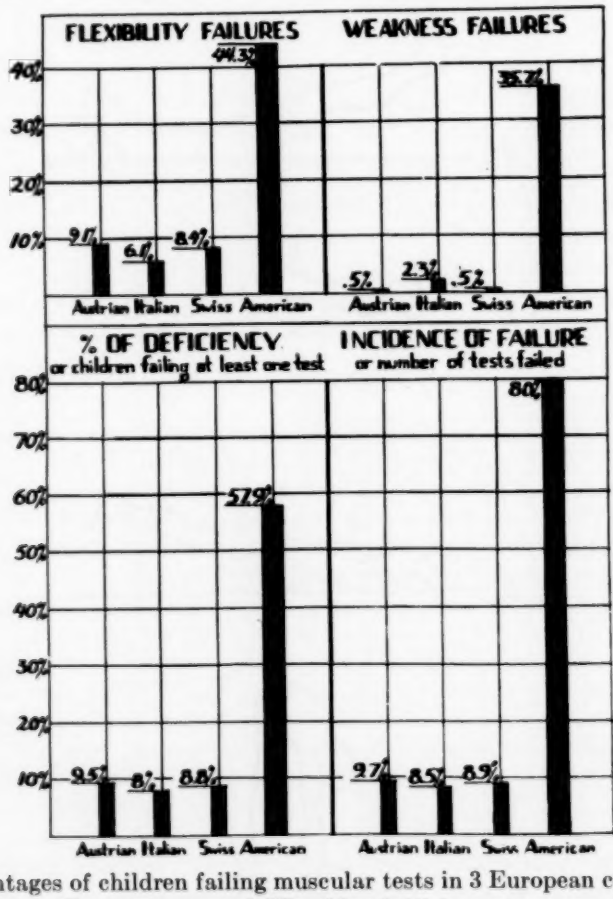

FIG. 6. Percentages of children failing muscular tests in 3 European countries compared with United States. (From Kraus and Hirschland (4).)

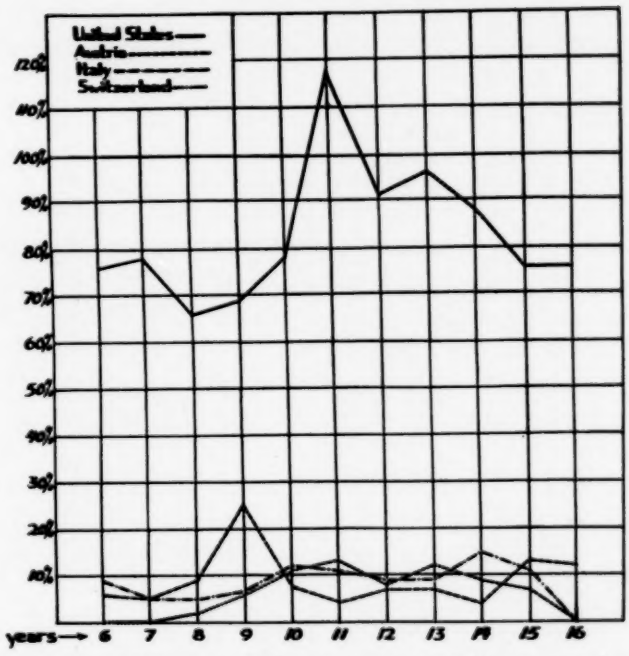

FIG. 7. Percentages of children at different age levels failing muscular tests, in 3 European countries (3 lower lines) compared with United States (top line). (From Kraus and Hirschland (4).)

Italy, Austria and Switzerland. In Italy they had no physical education. Nutrition was definitely below our standards in Italy, and probably slightly below in Austria. The figures representing three completely different countries were highly similar. As these countries are effectively separated by frontiers we consider this to be of significance.

Our studies also showed that American independent schools in which sufficient time is given to exercise yield far better results than American public schools.

It may be seen from the data in Figures 6 and 7 that our children are considerably weaker (almost 20 times) and much less flexible (almost 5 times) than comparative groups of foreign children. We feel that this difference is entirely due to lack of sufficient physical activity. The children abroad use their bodies not only for such activities as doing chores, walking back and forth to school, or climbing stairs, but must use them also as their only means of play and entertainment. Our children are not only freed from walking to and from school and from almost any chore requiring major physical exercise, but their entertainment is largely passive.

What does this mean? It means that our children are brought up without the benefit of the minimum physical activity necessary for healthy living. This is especially true in the first six years of their lives, when physical activity is just as important for normal development as is protection from emotional trauma. An increase in the rate of hypokinetic disease, such as coronary disease and certain orthopedic difficulties, can be predicted. An increase of emotional instability and subsequent decline of mental health is equally likely. Furthermore, the

number of our young people able to carry on an active, aggressive and productive life and able to serve their country as civilians as well as in the Armed Forces is declining.

THERAPEUTIC EXERCISE

What can be done to improve this situation?

We in the medical profession are faced with a major challenge and must take the lead by revising our attitude towards physical activity. Tests for muscle strength and flexibility should be incorporated in our routine physical examinations. We should also incorporate physical activity or exercise in our prescriptions. When trying to establish balance between intake of calories and intake of stimuli on one hand, and caloric output and nervous outlet on the other, we should attempt balance not only by restricting the intake but by increasing the output—by exercise.

We must be careful in our liberal overuse of "rest" as a prescription at any stage of disease. Rest is not necessarily a prerequisite for healing; it may well interfere with it. Avoidance of the overuse of rest is particularly applicable in the geriatric age groups.

Therapeutic and general exercise should be a common, well understood and expertly applied tool in the hands of any practitioner of medicine. Furthermore, we should be interested in prevention of disease due to under-exercise and should try to change our nation's attitude toward physical activity as a step in public health and preventive medicine.

Our physical education definitely needs expansion and there should be active participation on a wider basis. It is equally important that parents be educated not to overprotect their children and to let them spend a minimum of time in playpens and perambulators. This therapeutic principle applies, in varying degree, throughout life.

The need for physical activities was well known to the physician of past decades. It was frequently part of his prescription. We should like to start a wave of interest in restoring physical activity to its proper place in a well balanced life.

CONCLUSION

Lack of sufficient exercise constitutes a serious deficiency comparable to vitamin deficiency. In both, the lack is most serious in the early growing stages of a child's life. Provision of exercise at later stages may not be sufficient to relieve the damage that has gone beyond the functional state and has reached a chronic organic condition. Prevention of this deficiency is an urgent need.

Further research will be necessary to complete and broaden our preliminary impressions, to show the geographic incidence of under-exercise in this country, and to show the full impact and effect of under-exercise and its pathophysiology.

SUMMARY

Recent work on several hypokinetic disorders is presented. There is a national increase in the incidence of these diseases, due to the poor muscular state of our

youth. It is our responsibility as doctors of medicine to incorporate advice for exercise in our prescriptions and to press for a thorough revision of our attitude toward physical activity.

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TREATMENT OF THE GERIATRIC PATIENT IN A MENTAL HOSPITAL

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The number of patients admitted to State hospitals with the diagnosis of senility and arteriosclerosis is steadily increasing and approaches the number admitted with the diagnosis of schizophrenia (1, 2).

The Geriatric Building at Osawatomie (Kansas) State Hospital serves 220 patients ranging in age from 58 to 91. The sexes are equally divided. Although the individual diagnoses vary, as with most psychiatric groups, most of the patients display certain identical features due to the prevalence of brain damage. They are disoriented in one or more spheres. They have memory defects for recent events. Their vocabulary, general information, and power of calculation are decreased. Defective judgment and emotional lability are evident. The efficiency of performance is lowered and the task of relinquishing old habits is more difficult. Projective tests reveal a decline in emotional flexibility and control, and impaired social adaptability.

RELATIONSHIP OF INTELLECTUAL AND EMOTIONAL CHANGES TO PERSONALITY PATTERNS

Our observations on this group of older patients are in agreement with those of Gitelson (3), who attributes six different patterns of adjustment to old age:

A. A decreased memory for recent events (a turning away from the painfulness of the present),

B. A sharpening of memory for the past (especially when life was successful),

C. A more self-assertive attitude, as compensation for insecurity,

D. A mild depression, due to isolation and the feeling of loneliness,

E. Introversion and increased sensitivity, with querulous and paranoid attitudes, and

F. A free-floating anxiety caused by deaths among the same age group, especially when relatives or friends are involved.

The intellectual changes in these patients follow the pattern observed in the Stanford University studies carried out by Miles (4). He found that imagination seems to be ageless, and that verbal associations, generalizations, interpretations of meaning and recognition of relationships show less tendency to decline with age than do speed, organization, recall of unfamiliar material and difficult logical procedures. Gilbert (5), Wechsler (6), Brody (7), and Rapaport (8), using the Wechsler-Bellevue and the Babcock tests for the measurement of deterioration in psychotics, came to the same general conclusion. The total scores of the intelligence quotient show a progressive decline with advancing age, especially

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after the age of 40. Wechsler points out that the curves show a parallelism between loss of brain weight and decline of ability with age. Gitelson and Gilbert believe that the motivation to keep healthy mentally and physically is a very important factor against intellectual decline.

Familiarity with the histories of geriatrics patients shows that the emotional changes accompanying the aging process are dependent upon the life pattern of the individual. The person who always has been in a good state of emotional equilibrium will tend to retain it in old age. However, the individual who has been able to control his aggressive and destructive drives only superficially will be inclined to manifest more emotional disturbances when the powers of control break down in old age. A number of common stresses impinge upon the aged. They include economic dependency, lack of security, decrease of affection in the family circle, loss of respect and recognition, frustration in sexual activities, and physical and intellectual blows to the self-esteem. These stresses further decrease the strength of the ego. The lifelong personality pattern of the individual will be an important factor in determining his reaction to the inevitable stress by either withdrawal, suspicion, irritability, hostility, depression, outbursts of rage, or, on the other hand, by more adaptive defenses.

The interpersonal relationships typically suffer in the old-age group as a result of the manifold stresses which are met. Although this difficulty is probably experienced to some extent by all elderly people, it is exacerbated by pathologic conditions. An additional variable is cultural attitude toward the oldster. In Asia the parents and grandparents are considered as persons to be treated with special respect and veneration. However, in the modern Western culture the ability to produce and work commonly decides the person's worth, and the older individual is readily considered useless and a burden, thus inducing in him an increase of destructive drives toward others and himself.

These are the problems common to all patients in the old-age group in a mental hospital, regardless of diagnoses. Features such as intellectual and emotional changes as well as difficulties in interpersonal relationships are more or less evident in all patients. Other factors vary greatly. These include the physical condition (especially as it pertains to prognosis and treatment), the collaboration of relatives and friends, and the length of hospitalization. The longer the duration of the illness, or the older the patient, the more uncertain and less hopeful is the prognosis. This is particularly true in cases of chronic schizophrenia with cerebrovascular changes.

RESULTS OF TREATMENT

As has been pointed out by Thewlis (9), the treatment of the geriatric patient in a mental hospital is markedly different today from what it was twenty years ago. Prior to 1930 such patients received custodial care only. Our increased knowledge regarding treatment and dynamics of the old-age group has resulted in a sharply contrasting practice in caring for them. In addition to the treatment of the general physical condition, several effective somatic and psychotherapeutic forms of treatment have been created which provide a more optimistic out-

look. In the geriatric service at this hospital Thorazine (chlorpromazine), Serpasil, and Metrazol (together with nicotinic acid) are being utilized.

Thorazine (*chlorpromazine*) was given to 38 patients, starting in July 1954. The initial dosage was 25 mg. twice daily; this was increased after two weeks to 25 mg. three times daily, and after one month to 50 mg. three times daily. A few patients who refused to take the drug orally received an ampule containing 100 mg. once daily intramuscularly. In November 1954, a survey was made. At that time it was believed that 16 female patients were improved in their mental condition, although 9 did not change. Among 13 male patients, only 3 showed improvement. The patients who improved were quieter, more cooperative and less agitated. In February 1955, a placebo then was substituted for chlorpromazine for one month. After three weeks of placebo, 13 (11 female and 2 male) of the 38 patients became more noisy and disturbed, and the others did not show any change. The diagnoses in the patients who improved on Thorazine and became more disturbed while receiving placebo were as follows:

Chronic brain syndrome associated with cerebral arteriosclerosis with psychotic reaction—5 patients.

Chronic brain syndrome associated with senile brain disease with psychotic reaction—3 patients.

Mental deficiency with psychotic reaction—2 patients.

Manic depressive reaction, depressed type, chronic—1 patient.

Chronic brain syndrome associated with intoxication (alcoholic)—1 patient.

Acute brain syndrome associated with central nervous system syphilis—1 patient.

In this group (average age 70), no patient treated with Thorazine improved enough in mental condition to justify considering discharge from the hospital. However, Thorazine had the effect of releasing tension and anxiety, and made the geriatric patient more amenable to milieu therapy and group psychotherapy.

In January 1955, *Serpasil* was started in 9 patients; the initial dose was 0.25 mg. twice daily. After three weeks, the dose was increased to 0.25 mg. four times daily. This treatment was given for three months and then interrupted for one month (February 1955), when the patients were given placebo. The treatment had to be discontinued in 2 patients after one week, because of a sudden drop in blood pressure. Of the remaining 7 patients, 1 in whom the diagnosis was "schizophrenic reaction, paranoid type, chronic," showed improvement in his mental condition with a decrease in blood pressure, and 1 in whom the diagnosis was "manic depressive reaction, depressed type, chronic" showed improvement in his mental condition but no change in blood pressure. In 2 patients, no change either in mental condition or in blood pressure was evident. In 3 patients, the blood pressure decreased without any change in the mental condition. In this geriatric group of 9 patients (average age 68), improvement of the mental condition in 2 apparently was due to moderate sedative effect; they became less noisy, less irritable and slept better.

In January 1955, 24 patients were given *Metrazol*, usually with nicotinic acid; 4 received Metrazol alone and 2 received Metrazol in combination with electro-

convulsive shock therapy. The initial dosage of Metrazol was 200 mg. twice daily, and after one month the dose was doubled; placebo was not available. Of these 24 patients (average age 69), 6 showed improvement after four months of treatment. In 5 of the 6 improved patients the diagnosis was "chronic brain syndrome associated with cerebral arteriosclerosis with psychotic reaction." In the sixth the diagnosis was "psychoneurotic, reactive depression with senile features." These 6 patients became more sociable and more alert, were better oriented, showed improvement of memory for recent events and became more interested in activities. Sixteen patients did not show any change and 2 got worse.

Electro-convulsive shock is being administered to 8 geriatric patients (4 female and 4 male) at the present time. These patients suffer from chronic brain syndrome associated with cerebral arteriosclerosis, or senility with agitated depression. Only four electro-convulsive treatments were necessary before visible improvement occurred in each of these 8 patients.

An extensive *occupational therapy* program, with the development of special hobbies for senile patients, is an effective mode of treatment. This is also true of well organized *recreational activity* including concerts, dancing, bus rides, birthday parties, movies and television. These forms of therapy should be prescribed individually, with the viewpoint of increasing self-esteem, encouraging socialization, and providing outlets for aggressive drives (10). Such factors seem to be even more important for the older age group than for younger patients. Excellent response and results have been observed in the older patients.

Group psychotherapy has been found effective. Eight senile patients (4 men and 4 women) meet with the therapist once each week to discuss their problems. The attitude of the therapist is a passive one and permits the group members to express their feelings, to criticize each other and to form friendships. The encouraging results of group psychotherapy reported by Linden (11) are not only confirmed, but it is found that having both men and women in the same group is apparently more stimulating than composing the group of a single sex.

An important factor not to be overlooked in the treatment of the geriatric patient is the general ward environment. A building which provides ample space, fresh air, and sun is conducive to an optimal emotional atmosphere. Attractive curtains or flowers help considerably toward making the environment more optimistic and joyful. The geriatric patient is quick to realize whether he is liked and being treated with sympathy rather than as a burden, with no hope for improvement or cure.

The *attitude of the professional personnel* is a primary tool in the treatment of the older patient. These patients are especially sensitive, and an attitude of kindness, patience, understanding and optimism can be instrumental in aiding their adaptive adjustment.

SUMMARY

The admittance rate of geriatric patients to State mental hospitals is steadily increasing. Therefore, the treatment of the geriatric patient becomes more and

more of an important problem. A general view has been outlined, which involves somatic therapy (general physical care, medication with Thorazine, Serpasil or Metrazol, and electroshock), milieu-therapy (occupational and recreational) and group psychotherapy.

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ACUTE ABDOMINAL EMERGENCIES IN THE AGED

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The seasoned clinician is aware of the fact that practically any acute abdominal emergency may occur regardless of the age of the patient. Complications associated with neoplasia are far more frequent than acute abdominal disorders resulting from congenital anomalies; however, acute inflammatory syndromes are frequent and may appear in a bizarre form. This article is written to emphasize both the typical and altered clinical patterns which occur when an aged patient is stricken with an acute abdominal condition.

Acute disturbances within the abdomen will always rank high, if not first, among those conditions which tax the skill of the general practitioner and specialist alike. It is an inescapable fact that the more accurate the diagnosis, the lower will be the morbidity and mortality. To enumerate the sixty or seventy conditions which might be encountered in these emergencies is merely a display of cerebral muscle. After pondering over much statistical data one is impressed by the fact that only six conditions account for 90 to 95 per cent of the pathologic lesions which cause such emergencies. These six are:

1. Acute cholecystitis.
2. Acute hemorrhagic pancreatitis.
3. Perforated peptic ulcer.
4. Acute appendicitis.
5. Renal colics.
6. Acute coronary disease.

The conditions which constitute the remaining 5 to 10 per cent are too numerous to mention and cannot be discussed in a paper of this length. Space will permit only the mentioning of a few highlights pertaining to each of the six disorders enumerated; the discussion will emphasize the practical rather than the theoretical importance.

ACUTE CHOLECYSTITIS

Certain types of people are predisposed to certain types of diseases. The seven "F" type describes the usual gallbladder patient. She is the Fair, Fat, Fertile, Flatulent, Flabby, Female of Forty. There is no dogma in medicine; hence, practically any type of person may acquire any type of disease. One does not feel as chagrined in overlooking the rare, as he does in overlooking the apparent.

The pain which is associated with an attack of acute cholecystitis may be either constant or colicky. Constant pain is due to continuous pressure upon nerve endings but colicky pain is caused by obstruction. This is an important differentiation, as therapy differs greatly when the physician is treating a strictly inflammatory lesion or one associated with obstruction. The acute gallbladder

patient who presents continuous pain may be tided over the acute phase on a conservative regimen, whereas operative therapy in an obstructed condition becomes mandatory. It should be emphasized that gallbladder pain does not radiate to the right shoulder, but rather follows the course of the seventh intercostal nerve and therefore radiates to the tip of the right scapula or the interscapular area. Any pain that radiates to the shoulder suggests an irritation of the phrenic nerve (C4), usually caused by peritonitis with subphrenic contamination.

Although pain, a symptom, may be referred anywhere along its nervous path, tenderness, a physical finding, remains at the site of the pathologic lesion. Tenderness in acute cholecystitis is usually present in the right upper quadrant close to the right costal arch. Should such tenderness be at a lower level, it can be related to gallbladder pathology only if the normal tympany to percussion in the right upper quadrant is replaced by flatness.

Treatment

Whether or not to operate on an acutely inflamed gallbladder is still a moot question. It is far better to permit the acute inflammation to subside and then perform an elective cholecystectomy in a nonedematous and nonhyperemic field; this, however, is not always possible. I have found it helpful to consider the following five questions and in this way to determine whether conservative therapy or operative intervention is the treatment of choice:

1. Is the pain continuous or colicky (discussed previously)?
2. What sort of risk is the patient?

Although some patients chronologically are 40 years of age, anatomically they may be closer to 50 or 60 years of age. The risk must be evaluated carefully to determine the type of therapy.

3. How many attacks has the patient had previously?

The result of all inflammation is cicatrization. Scar tissue has a very poor blood supply and few or no elastic fibers. If the patient had had numerous attacks it is safer to operate, but if it is a first or second attack, conservative therapy should be considered seriously.

4. What is the duration of the present attack?

Patients with acute gallbladder disease seen within the first six to twelve hours may respond well to surgical treatment; patients with acute cholecystitis for over twenty-four hours, and certainly for over forty-eight hours, are better treated medically if possible.

5. What is the progress of the present attack?

Fever, tenderness, distention, pain, vomiting and numerous other signs and symptoms are all helpful in determining whether the patient is improving or getting worse. The simplest method of answering this question is by checking and charting the pulse every hour on the hour. If the pulse rises 20 beats within an hour and continues to rise, this speaks for spreading and soiling and warrants surgical intervention.

The foregoing five questions do not offer a simple yardstick to determine operability. However, each of these phases must be carefully considered and in only this way can the question as to proper therapy be answered.

ACUTE HEMORRHAGIC PANCREATITIS

In the light of present knowledge concerning the pancreas, it is not too unusual to make a correct diagnosis of acute pancreatitis preoperatively. Persons predisposed to gallbladder disease are similarly predisposed to pancreatitis. The exact cause or causes of this condition are unknown. It is believed that any agent or agents which might activate the pancreatic enzymes within the pancreas, particularly trypsinogen-trypsin, might precipitate such an attack. Such causative agents might be presented in the form of the following alliteration: Bacteria, Blood, Bile, Body juices and Booze. Any or all of these seem to have some role in the etiology of pancreatitis, especially if there is a communication or common channel between the common and pancreatic ducts.

It is well known that a milder form of the disease has been referred to as acute edematous pancreatitis. However, in the severe hemorrhagic (necrotizing) type, shock or a shock-like syndrome is present. The tenderness is diffuse and the rigidity is often board-like. A particular type of pain may be present and if so will impress the keen observer immediately. This pain is aggravated when the patient is on his back and is relieved markedly when he assumes a sitting or upright posture; he may even want to be in the prone position. Whenever a patient with an acute abdominal condition prefers to assume a sitting position, a pancreatic lesion must be the first to be excluded. Tests for serum enzymes (particularly amylase) are helpful within the first seventy-two hours. It should be remembered that morphine may also cause an elevated serum amylase level.

Treatment

The tendency at present is to treat acute pancreatitis medically rather than surgically. Of particular help is the use of nasogastric siphonage. By keeping the stomach empty and aspirating the hydrochloric acid, the duodenal mucosa is not stimulated to produce secretin, and this in turn diminishes pancreatic activity. If one can be certain of the diagnosis, it seems far better to reserve surgical intervention for the complications if they develop. Numerous other methods of treatment have been advocated; these can be found in any standard text or monograph.

PERFORATED PEPTIC ULCER

Although recent studies tend to show that this condition is becoming more frequent in the female it, nevertheless, appears to be a lesion to which the male is particularly prone. In my practice it has been most unusual to see a perforated peptic ulcer in a woman. The classic picture of the sudden onset of agonizing pain with board-like rigidity and a shock-like syndrome is well known.

The following highlights should be emphasized. Abdominal auscultation is of distinct value in the diagnosis of spreading peritonitis, particularly in the case of a perforated peptic ulcer. As the peritoneal soiling spreads, the intestinal sounds diminish. Thus, the phrase has been coined, "the wetter they are the quieter they are." This simple finding is of inestimable value. It is unusual to see a case of perforated peptic ulcer in which normal bowel sounds are heard. Another sign which helps to clinch the diagnosis is the demonstration of a spon-

taneous pneumoperitoneum. This results when the stomach air bubble makes its exit through the perforation and into the peritoneal cavity.

Exceptions to every rule are of particular importance; the forme-fruste ulcer is such an exception. This term refers to a pin-point perforation which immediately becomes sealed and prevents any appreciable leak-soiling of the peritoneal cavity. Because of this, the characteristic signs and symptoms are lacking. Such a patient, despite the fact that he has a perforated peptic ulcer, may walk into the doctor's consultation room. However, after obtaining an accurate history and conducting a meticulous physical examination, even such minimal perforations can be diagnosed.

Duodenal or gastric contents may escape and leak downward along the so-called paracolic gutter of the ascending colon and become pooled around the appendix. This results in pseudo McBurney-point tenderness, and may lead to an erroneous diagnosis of acute appendicitis and an unnecessary removal of a red but nevertheless innocuous appendix. In such cases the perforated ulcer usually continues to leak and death may ensue.

Treatment

Although there is a tendency of late on the part of some to advocate conservative treatment for perforated peptic ulcer, the consensus still leans toward early closure of the perforation. Conservative treatment is reserved for those cases which are seen twenty-four hours after perforation.

ACUTE APPENDICITIS

Probably the three most dangerous words that any physician may utter are "*only an appendix.*" The more one observes this condition the more one realizes that it may present itself in a variety of bizarre forms, especially in the aged. Although the incidence drops precipitously after the age of 40, acute appendicitis may occur in any age decade. Despite modern chemotherapy, it still accounts for thousands of deaths annually. These possibly avoidable deaths might well be due to Procrastination, Purgation and Poor surgical judgment. The physician is well aware that any diffuse epigastric distress which becomes localized in the right lower quadrant within twenty-four hours is acute appendicitis until proved otherwise. The patient unfortunately does not use such terminology; hence, the "Two-question Test" has been devised and has been found to be simple, accurate and extremely helpful. The test is conducted in the following way:

Question Number One: "Where was your pain when it started?" The patient points to his entire abdomen.

Question Number Two: "Where does it hurt you now?" He then points to the right lower quadrant, usually McBurney's point.

It is unfortunate that anorexia has not been stressed as the most common symptom associated with acute appendicitis. I fear diagnosing acute appendicitis in any patient who states that he is hungry. Anorexia, nausea and vomiting are three degrees of one symptom, being dependent upon the amount of distention in the appendix. Since all appendices, when acutely inflamed, are at least

theoretically distended, then all patients with appendicitis should present a loss of appetite. When the distention within the appendix is marked, the patient complains of nausea or vomiting. Fever is usually absent in early appendicitis. When the temperature rises above 100 degrees F., peritoneal soiling rather than appendicitis per se is diagnosed. This, however, does not pertain to children, who may have a high fever in the presence of almost any early lesion.

Acute appendicitis does not cause right rectus rigidity. Although the reverse has been taught, it nevertheless is a fact that it is impossible to contract one rectus muscle without contracting the other. Only if an underlying mass is present is it possible for one rectus to feel rigid. When both recti react to pressure this is muscular defense and not rectus rigidity. The importance of making this distinction is understood when one realizes that the entire course of treatment may be altered by the presence or absence of an appendiceal mass. Many signs and tests have been described under the heading of acute appendicitis but these are too numerous to mention and of too little practical value. Bidigital examination (one finger in the vagina and one finger in the anal orifice) whenever possible is preferable to rectal or bimanual examinations. By means of the bidigital examination the examiner is oriented immediately and does not confuse cervix, feces, adnexae or appendiceal masses. The usual laboratory tests which are helpful are routine blood counts and urinalyses; the differential blood count is probably the most informative.

Treatment

Modern chemotherapy has somewhat altered the treatment of acute appendicitis, but two schools of thought still exist. One group believes that this condition should be treated surgically whenever and wherever possible; the other group advocates conservative therapy in the so-called late or neglected case. There is also a middle-of-the-road type of therapy, which incorporates some of the tenets of both groups. It is mandatory to remove a leaking focus from within the peritoneal cavity. However, there are times and conditions which make this impossible. This does not apply to children, as they have not acquired an immunity with which to combat the infection nor have they an omentum well enough developed to aid in localization. Therefore, children should be operated upon whenever the condition is diagnosed.

RENAL COLICS

The word colics is intentionally written in the plural form, as other substances besides an opaque calculus may cause this syndrome. Microscopic thrombi, uratic debris, and a ptosed kidney may also induce such pain. Anything which can cause dilatation of the ureter may be associated with renal or ureteral colics. The typical pain in the right loin, with radiation downward along the course of the ureter and into the inner aspect of the thigh or genitalia, is well known. A point which is particularly valuable is the occurrence of bradycardia. It has been stated aptly that any case of acute abdominal pain with bradycardia is renal or ureteral colic until proved otherwise. That there may be an associated

pseudo ileus particularly in patients who have a history of gout or parathyroid pathology, must be kept in mind. The demonstration of a stone on the flat roentgenogram, and positive findings in the urine, are good corroborative evidence. Emergency intravenous pyelography at times provides evidence to clinch the diagnosis.

CORONARY OCCLUSION

To discuss coronary disease under the heading of "Acute Abdominal Emergencies" might appear to be sacreligious. However, to open an abdomen unnecessarily, in the presence of an acute coronary attack, is to court disaster. The term coronary disease is used here as all-inclusive. Any pain anywhere in the body which is precipitated by exertion or emotion (pleasant or unpleasant) and relieved by nitrites is coronary disease. That such pain may be referred to the abdomen, particularly the epigastrium, is well known. Electrographic abnormalities, elevated leukocyte counts and audible friction rubs are helpful diagnostic findings, but these are the exception and not the rule within the first few hours. Such patients, however, if carefully examined will fail to show rectus muscle defense, particularly if such contraction is sought for at the end of inspiration.

SUMMARY

Six conditions which account for over 90 per cent of the pathologic conditions in acute abdominal emergencies have been enumerated. A few important points in differential diagnosis have been outlined. An attempt has been made to emphasize the points which are of practical and bedside value.

PROBLEMS PECULIAR TO SURGERY OF THE AGED*

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Increasing numbers of patients in the older age group of 60 to 75 years, and many in the extreme age group of 75 years and over, are tolerating surgical procedures of some magnitude, with decreasing postoperative morbidity and mortality. Evidence is growing that elderly patients can withstand moderate major operations with a mortality rate not far removed from that for operations on younger patients. Nevertheless, for radical major operative procedures, the mortality in the elderly remains much higher.

There is an ever-present challenge when operating upon elderly patients, because the majority have an already decreased physiologic reserve, with often one or more concurrent complicating diseases and deficiencies. Of greatest significance over the past two or three decades has been a realization of the importance of preoperative correction of complications as early as possible in the aged patient, even though the correction be only temporary. Keener insight into the physiologic alterations of the aging process has improved operability, avoided much postoperative morbidity, and immeasurably reduced the problems and hazards of geriatric surgery.

Opinions differ as to when a person has reached old age, and at what age senile changes begin to have a marked effect on organs and tissues of the body. This continues to be a moot question, of special interest to those concerned with surgical operations on the aged. Any attempt at a definitive answer, must be hypothetical. We have seen patients who are seemingly old at 60 or less, and those who often show little significant evidence of physiologic senescence at 75 or more. Chronologic age alone, no longer determines physiologic aging. Oberhelman (1) points out that "... one often sees persons who are chronologically young but biologically old, and conversely, persons who are chronologically old but biologically young."

In the final analysis, the clinical findings are our best index to the degree of physiologic reserve of the aged patient, although we cannot postulate the exact age at which changes begin to take place. In the reports of those concerned with

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surgery of the aged, the minimal age threshold varies between 60 and 70 years, and some observers place the basic minimal age under 50. Cole (2) feels that the deteriorating effects of aging do not develop significantly much before 60. He explains this by pointing out that the female menopause and male climacteric very often occur between the ages of 50 and 60.

Scientific advances have lengthened the life span to approximately 68 years. According to the figures of the United States Bureau of Census (3, 4), the population of the United States increased 7.2 per cent from 1930 to 1940; the number of persons of 65 to 75 years, 35 per cent; and those over 75 years of age, 38 per cent. Since 1940 these figures have risen markedly. Bosch and associates (5) predict that, in the next twenty-five years, persons of 60 years and more will constitute 20 per cent of our population. It becomes apparent, therefore, that surgeons must be prepared to operate on growing numbers of elderly patients; that every attempt must be made to treat these patients; and that they should not be considered too old to tolerate major elective surgical procedures.

OPERABILITY

Southwick, Slaughter and Bollinger (6) believe that surgical therapy in the elderly, should be performed as soon as the patient can be brought into a good nutritional state. They stress the importance of stopping a disease process as early as possible in the aged patient because, although the disease may be a benign one, its prolonged continuation in an older patient may result in a fatality. The present authors concur in this, and are also heartily in accord with Cole when he states, "Too often surgical therapy for elective conditions is postponed in elderly patients, in the hope I presume, that the patient will die of some other disease before the present one threatens his life."

Although the elderly, even in the extreme age group, need not be denied the benefit of elective operations, we must recognize that whereas these patients are able to tolerate major surgical procedures, they cannot bear the added burden of complicating diseases and severe deficits. We must also realize that one aged patient's condition may permit immediate operation, with routine preoperative care; but the condition of another may require a great deal of preparation (such as nutritional and hematologic build-up, or correction of some concurrent complication) and operation has to be postponed until the general condition has been brought to the best possible state.

Differential evaluation of elderly patients as regards operability and choice of anesthesia, and successful geriatric surgery, depend upon knowledge of physiologic functional changes and deficiencies, and methods for their alleviation or control; knowledge of surgical physiology and the anatomic changes which occur with the aging process; the surgeon's ability to select the best operative procedure for a particular patient; and the ability of the anesthetist and his experience with specific anesthetic agents in the surgery of geriatric patients.

It bears re-emphasis, that most aged patients have an inadequate physiologic reserve, frequently with one or more deficiencies and/or concurrent systemic dysfunctions, of which only one may show serious manifestations. These in-

clude: 1) malnutrition, with or without hypoproteinemia and general avitaminosis, owing to poor appetite, dental difficulties, severe vomiting, anorexia, gastrointestinal fistula, hepatitis, and other causes; 2) arteriosclerotic alterations in the blood vessels of the kidney, which tend toward renal dysfunction and arteriosclerotic nephritis and oliguria; 3) a high level of blood urea nitrogen which, in the experience of the authors, is one of the most ominous preoperative contraindications; 4) hypoxia and anoxia, caused by vascular changes in the brain; 5) inadequate cardiac reserve; 6) disturbed fluid and electrolyte balance, often with severe dehydration owing to severe vomiting, diarrhea, or poor fluid intake; 7) liver and bladder dysfunctions; 8) emphysema and other pulmonary diseases; 9) diseases of the biliary tract; 10) anemia and low blood volume (Beling and associates (7) found the blood volume per kilo of body weight lower in elderly patients); 11) hormonal deficiencies; 12) susceptibility to infection, particularly peritonitis; 13) depression of the bone marrow; 14) susceptibility to vascular shock from hemorrhage and other causes; and 15) poor tolerance of extreme heat and cold, owing to vascular changes.

PREOPERATIVE PREPARATION

When major elective surgery is anticipated on an elderly patient, the available time should be judiciously used in a careful evaluation, physical examination, and laboratory studies; and in certain circumstances, such as serious cardiac disease, in consultation with an internist. Such analysis of the preoperative condition of the elderly patient whenever possible, pays great dividends in improving operability. Close attention to details such as preoperative build-up and preoperative correction of any correctable complications, is nowhere so important and rewarding as in the elderly, for these concurrent diseases and deficits rival postoperative complications as a cause of operative mortality in aged patients. Preoperative preparation is an essential and integral part of successful geriatric surgery.

A complete physical examination should be made, and a history taken, including information regarding present and previous medication, such as the administration of cortisone and corticotropin (ACTH).

The nutritional status of the elderly patient should be carefully assayed, with close attention to caloric intake. As far as possible, any existing deficiencies should be counteracted preoperatively.

Liver function tests should be performed when disease of the biliary tract is suspected.

Electrocardiographic studies should be made, if only to detect a possible recent coronary occlusion. Likewise, a clinical appraisal of the cardiac status is important. This is obtained by questioning the patient regarding ankle edema, orthopnea, and dyspnea and/or pain on climbing stairs and other exertion. It is important that measures be taken to improve or restore cardiac function preoperatively.

Determinations of vital capacity should be made in studying pulmonary reserve, and a careful prostatic examination and evaluation is advisable.

Laboratory analyses are of extreme importance in the older patient. The following determinations should be made: blood sugar, nonprotein nitrogen, albumin/globulin ratio, potassium, chloride, blood volume, hematocrit, hemoglobin, blood type and cross matching, complete blood count, and urinalysis. X-ray studies should also be carried out.

One of the most serious deficiencies in elderly surgical patients, is an inadequate volume of blood. Blood volume studies, whenever possible, are of great significance. They are of more value in these patients than the hematocrit, hemoglobin and red cell determinations. Beling and associates reported a mortality rate of 17.4 per cent in their study of 190 patients in whom no blood volume studies were made, and 8.0 per cent in 100 patients with blood volume studies.

Hormonal therapy is also of value in improving the operability of the aged patient. For example, Cole suggests that in elderly debilitated men, testosterone may be helpful in alleviating weakness, anorexia and diffuse pain. He also mentions the beneficial effects of corticotropin and cortisone on certain occasions in improving operability of the elderly patient by stimulation of appetite, gain in strength and weight, and elimination of fever. However, he emphasizes that this benefit is sustained in only a minority of patients; at present there is no way of determining accurately which patients will benefit from these measures. Cole gives 100 mg. of corticotropin daily for five or six days preoperatively to certain elderly patients who are poor operative risks, and states that it should be continued in diminishing doses each day for a few days postoperatively. He warns, however, that if used over a long period these drugs (particularly cortisone) may give rise to so much adrenal atrophy that shock may ensue after a major operation. The present authors also point out that these drugs, if not cautiously given and watched, may retard tissue healing. It is generally recognized by those concerned in geriatric surgery that all preoperative medication should be judiciously administered to the aged patient, and the dosage of narcotics and sedatives reduced.

Psychic evaluation is also important in the elderly, as the fears and the familial and/or socio-economic problems of the senescent patient may have far-reaching effects on recovery, sometimes on the will to survive. Every attempt should be made to allay the fear of operation by assurances that much of the hazard of surgery in older patients has been eliminated.

Effort should be made to effect and maintain preoperative ambulation. It is now well recognized that the elderly patient should be up and about before operation, if possible, in order to prevent atrophy of muscles and, according to Cole, in order to avoid a negative nitrogen balance which often ensues in the older patient who is preoperatively bedfast.

It is essential that elderly patients go to the operating room with a Foley catheter inserted into the urinary bladder to facilitate urinary output, and a Levine tube introduced for Wangensteen suction to keep the stomach empty and prevent vomiting and pulmonary difficulties.

Elderly patients with no concurrent disease or complications tolerate major elective operations almost as well as younger patients, but emergency surgery is

tolerated poorly. When an emergency operation is necessary in the aged, and the time element is significant, adequate preoperative supportive measures often make the difference between life and death.

Occasionally, there is the possibility of preventing major emergency surgery in an aged person, and reversing an emergency operation into an elective one. Whenever the immediate crisis can be resolved, and the surgeon can prepare and operate upon such a patient in a routine, unhurried manner, he can count himself fortunate.

When operation is contraindicated in an older patient with a surgical disease, the surgeon must frequently weigh the hazard of surgical intervention as a life-saving attempt, against the hazard of the disease itself. In malignant conditions, surgery is often strictly limited to palliative procedures. Surgical disorders in the aged do not differ greatly from those in younger patients, but operations on the elderly must be fitted to the individual patient.

ANESTHESIA

In the aged, in whom the margin of safety is narrow, anesthesia must be administered with extreme skill. It must be carefully watched, and its course frequently altered during operation. Therefore, in surgery of the aged, the presence of a skilled and experienced anesthesiologist is far more important than the choice of the anesthetic agent. However, as the scope of this paper will not permit detailed discussion of the advantages and disadvantages of all of the various approved anesthetic agents, a few salient principles should be emphasized.

Regional local anesthesia should be used in elderly persons, whenever feasible. Sadove and Kahan (8) believe that even when a general anesthetic is given to these patients, regional local anesthesia is an important adjunct to the general anesthetic agent, in order to eliminate shock, elevate blood pressure, and decrease the pulse.

Next, hypoxia must be avoided, as this is tolerated poorly by elderly patients, and is often a cause of cardiac arrest. Therefore, an effective anesthetic agent must be selected which will permit adequate oxygenation. In this regard, although spinal anesthesia may be a valuable procedure in some older patients with pulmonary complications, it may be contraindicated in the presence of arteriosclerotic hypertension, as even a slightly lowered pressure may cause hypoxia, oliguria and myocardial infarction.

Cyclopropane, in anesthesia of the aged, has been found to be a valuable agent, as its administration is followed by comparative lack of disturbance in the body metabolism. However, because of its cardiac effects and the need for utmost skill in its administration, some prefer not to employ this agent in elderly patients. Most authors agree that it is contraindicated in those with heart block or severe bradycardia.

Although Sadove and Kahan agree that cyclopropane is not a wise choice in persons with heart block, they do employ this agent in some elderly patients with coronary disease because of its nontoxic effect on the myocardium, and in those with auricular fibrillation and mild heart strain of various types. Nevertheless,

these authors state that "In the hands of the skilled it becomes an excellent agent, but it must be admitted that it is as dangerous as the skill or the lack of skill of the individual permits it to become."

Pentothal is a useful anesthetic agent for induction, or for minor operative procedures, but is particularly depressing for prolonged major operations on the elderly. This drug should seldom be employed, even as an inducing agent, in older patients with respiratory difficulties, dyspnea or orthopnea.

In addition to the meticulous administration of anesthesia during operation on aged patients, another important duty and grave responsibility of the skilled anesthetist is judicious administration of intravenous fluids, and estimation and replacement of blood loss during surgery. This blood replacement, even in the presence of cardiac disease, is mandatory in the elderly. Nevertheless, it must be performed cautiously, to prevent additional cardiac strain. It should be emphasized that, because of the greatly lessened contractibility of the blood vessel walls in older patients, any variation in blood volume is tolerated poorly. In this respect, it is far wiser to undertransfuse than overtransfuse these patients.

OPERATION

During surgical therapy of the elderly, it should be borne in mind that in addition to correct operative technic, conservation of time is of great importance. In order that the aged patient not be under anesthesia for an unduly prolonged period, completion of the operation in the shortest possible time is essential, consistent with extreme care in technic and handling of the delicate tissues. Because of the frequently poor physiologic reserve of aged patients, they must be watched closely during the operative period. The surgeon must use his best judgment and be prepared to change his plans of operation should the condition of the patient deteriorate. It frequently becomes necessary to shorten the operative procedure, or to conduct it in stages.

There is the problem of arteriosclerotic arteries in elderly patients; trauma to the delicate veins and arteries should be avoided. Therefore, any great pressure on the extremities of these individuals is discouraged.

POSTOPERATIVE CARE

The immediate postoperative period is a vitally significant phase in operations on the elderly. Special care must be used in lifting and moving these patients after operation, as unless they are in good condition when surgery is completed, shock may ensue in their transport from the operating table to the recovery room, and to the bed.

Fluid and electrolyte balance, and frequently the replacement of blood, must be maintained during the immediate postoperative period. However, this must be carried out with caution. Intravenous fluids should not be excessive in the aged, and it is better to underhydrate than overhydrate because of the tendency to the development of moist lungs. Furthermore, since the kidney of the older patient is less able to secrete concentrated urine, the use of saline solutions should be avoided during the first twenty-four hours postoperatively.

Before consciousness has returned, the aged patient should be turned from side to side, to prevent the aspiration of gastric contents into the lungs.

Postoperatively, continuous Wangensteen suction is also of particular value in the elderly, to maintain stomach and upper intestinal decompression. This prevents vomiting and helps to prevent tracheal and bronchial aspiration. It also hastens preparation for the oral administration of fluids in the early postoperative period. This tube suction should be discontinued as soon as feasible, in order that oral intake of food may be started as early as possible, to counteract the malnutrition so commonly observed in these older people. Understandably, this is not always possible after gastric resection. In such patients, we employ an Abbott-Rawson tube, which permits decompression of the stomach and jejunal feedings.

Atelectasis is one of the most frequent postoperative complications in the aged. If there is evidence of atelectasis, and the patient is unable to cough up mucus, the trachea and bronchi should be aspirated by suction. If mucus continues to accumulate and cannot be evacuated by tube suction, bronchoscopy may be necessary. In some instances, a tracheotomy is a life-saving procedure. Postoperative oxygen therapy, preferably by nasal catheter or mask in the elderly patient, also becomes a frequent necessity for the alleviation of cardiac embarrassment or restricted pulmonary function due to atelectasis.

Since the elderly person has a tendency toward the development of pulmonary complications, deep breathing exercises should be started as early as possible. The patient should be made to cough and his position should be changed at frequent intervals. Free and frequent movement of the extremities also should be encouraged.

Postoperative sedation should be kept at a minimum in the aged.

It should be emphasized that postoperative ambulation of the elderly patient must be carefully considered. There may be some merit to early ambulation in decreasing the occurrence of such complications as phlebothrombosis and pulmonary embolism. However, the senior author has stated previously (9) that good judgment must be exercised, influenced by the age, type of patient and the operative procedure performed. At the same time, he has pointed out that early ambulation is contraindicated in the presence of active or recent thrombi or emboli, cardiac decompensation, recent coronary occlusion, suppurative conditions such as peritonitis, hemorrhage or danger of hemorrhage, severe malnutrition and anemia, extreme weakness, insecure anastomosis and difficult hernia repair, severe abdominal distention, and high fever.

SUMMARY AND CONCLUSIONS

Problems arising in operations on the aged have been discussed. The authors have attempted to make clear their conviction that postponement of an elective operation on the elderly patient, on the basis of age alone, is a too frequent error.

The fact that the elderly can tolerate elective surgical procedures of some magnitude with a lowering mortality rate, is due in large part to recognition of the importance of determining and improving operability whenever possible. Thus they are relieved of an added operative load which they cannot tolerate.

Cardiac disease is a common cause of postoperative death in the elderly. Nevertheless, the ability to negotiate stairs without dyspnea or anginal pain, or lie flat in bed without cough or ankle edema, are favorable preoperative signs. An electrocardiogram, although of value in detecting a coronary occlusion, should not be the barometer for determining a contraindication to surgery. In fact, if several months have elapsed since a coronary occlusion, a patient may still be a satisfactory candidate for operation, from this standpoint.

Too much importance should not be attached to antibiotics in the surgical therapy of elderly patients, except in the treatment of surgical diseases of the gastro-intestinal tract, or when there is active infection in the surgical field, or a generalized peritonitis. When antibiotics are necessary, the patient must be constantly watched, and these drugs immediately discontinued should untoward reactions occur.

The conclusion is drawn that concurrent and complicating pathologic conditions increase the mortality in major surgery of the aged, to a greater extent than in younger patients. However, preoperative correction of complications, advances in surgical judgment and technics, improved anesthesia, skillful replacement of fluid and blood loss during and after operation, and careful preoperative and postoperative care, have enhanced the benefits of geriatric surgery.

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TREATMENT OF PARKINSON'S DISEASE IN THE AGED

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INTRODUCTION

Parkinson's disease, which usually appears between the fortieth and sixty-fifth years, is not a disease which causes death. It is not surprising then, that it adds a large number of patients to the geriatric group. There is considerable evidence that the pathologic conditions of old age, such as cerebral arteriosclerosis and hypertension, do not in themselves cause Parkinson's disorder. In spite of this, it is customary to make a diagnosis of senile parkinsonism in patients in the age group over 60. The more careful the clinical history in such cases, however, the more abused this classification appears. For example, a patient who first noted tremor in his *left hand* at the age of 68, when he had clear evidence of hypertensive heart disease, was labelled by his physician as a case of senile parkinsonism. However, on subsequent interviews the patient was able to recall that he had influenza with probable encephalitis in 1918. At the age of 23, five years later, while working as a roofer, he noted difficulty in getting his left fingers away from the roofing nail before the hammer descended. The reason he remembered this incident was due to the severe teasing by his mates for being clumsy and suffering from a hangover. He was a teetotaler. He managed to develop a new technic which did not seriously slow his work and he continued as a carpenter until his retirement at the age of 65. Further historical data in this case included the fact that about six years after the first incident a fellow carpenter asked for the loan of a screw driver. The patient handed it to his friend with his left hand and was unable to release it quickly. This caused a comment about not being trusted with his tools, which offended him and left a memory trace that was elicited in the history when he was interviewed. In this particular case the disorder gradually developed over at least thirty years, but did not become a serious threat, nor was tremor manifested, until it was associated with hypertension and vascular disease.

We have carefully checked 20 patients with repeated histories and interviews and found the average time that the Parkinson's disease could be traced back from the conventional history obtained by the patient's physician was ten years. Therefore, in the aged it is probably the same process as in middle life but complicated by other problems associated with geriatrics. It is not a specific geriatric entity.

There is no question from the purely practical standpoint that any chronic disease is harder to bear in the presence of a second one. The problem of parkinsonism in the aged is essentially that of the presence of other disease conditions that emerge under the setting of parkinsonism.

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These are:

1. Diseases of the vascular system: arteriosclerosis, arthrosclerosis, hypertension, and chronic heart disease with mild decompensation.
2. Diabetes with all its dietary, insulin and other complications.
3. Arthritis, particularly of the hypertrophic variety, spondylitis and demineralization of the bone, with susceptibility to fractures.
4. Gastro-intestinal disturbances such as colitis, constipation, gastritis, malnutrition, and diseases of the liver and gallbladder.
5. Loss of teeth—an oft neglected condition which is particularly hazardous and upsetting to patients with Parkinson's disease.
6. Various conditions associated with deafness and loss of vision.
7. Psychogenic disturbances, caused by retirement from work, isolation from family, the depressions of old age and a number of environment and psychiatric complications.

In some situations a number of these conditions may be present together with the Parkinson disorder, and it is no wonder that such patients are troubled.

There are other points that differentiate the younger Parkinson case from the older one. As a favorable asset, there is the fact that in the geriatric period the necessity for competition and career-building is not present. More patients of this older group are eligible for either complete or partial retirement with support. Dependent children are less likely to be a burden and there is usually some type of established security. On the other hand, the threat of loss of income, and the hopeless inability to earn a livelihood in the presence of both old age and chronic disease, is more terrible a specter than in young people whose courage and resistance might be greater.

Judging from our 400 cases, there is no essential difference in the clinical signs, in the three types of Parkinson's disease, except that oculogyric crises are extremely rare in the elderly patient. All the other symptoms can be found more or less equally distributed in the aged as well as in the young. There is one factor, however, which bears mention here. There is a tendency on the part of middle-aged patients with so-called idiopathic or postencephalitic Parkinson's disorder to drift into a more stable condition which does not change from year to year, whereas in many older patients the disease seems to progress rapidly and threatens precipitous invalidism sooner than in the younger group. This is usually due to a rapid development of the other medical conditions mentioned previously, which add to the parkinsonism and push the patient too far. The disease may have an even course without much evidence of progression, and then there may be sudden deterioration with marked disability in all fields at a time when the blood pressure is elevated from true hypertension and renal-vascular function is reduced. There seems to be a general pattern of progression in this disease in elderly patients which is reflected by the rate of their growing old, with particular emphasis on the cardiovascular system.

DRUG THERAPY

One of the most conspicuous differences between the geriatric patient and the younger one with Parkinson's disorder is the sensitivity to belladonna, atropine

and synthetic drugs of the Artane type (1). Patients who are able to tolerate large daily doses of scopolamine, Artane or Benadryl between the ages of 55 and 60, may rather precipitously in their 60's and 70's, show increasing sensitivity to these same medicines. In other cases in which the disease makes its *overt* appearance during the geriatric period this sensitivity may be manifested in an extreme manner. This sensitivity often follows a pattern. The patient can usually take the medicine in the morning without too much difficulty but a dose taken after supper induces marked mental confusion, hallucinations (both auditory and visual) and sometimes rather upsetting paranoid delusional symptoms. Some of these are associated with a type of delirium during the night, with both difficult and disturbed sleep. In the morning the patient will have little recollection of the episode and may again tolerate reasonable doses of the drugs during the day. In addition to the mental disturbances which are most marked at night, the effects of these drugs on the gastro-intestinal and urinary symptoms are much more marked in this age group. Urinary retention or marked difficulty in starting the stream sometimes occurs. Constipation, which formerly responded to mild cathartics or an occasional enema in the middle 50's and 60's, may develop into a severe obstipation with fecal impaction in the older years, with the same dosage of the drugs. It is not enough simply to reduce the dose in the afternoon and evening in such situations, but the total amount given must be cut down to as much as half or quarter of previous levels. In some instances the patients are completely intolerant of any atropine drugs without side effects, and regulation has to be accomplished with some other medication such as parsidol. It is for this reason that when medication is started in a person in the geriatric group, administration must be carried out far more cautiously and with much smaller increments than in a younger patient. Benefits from the drugs, when they occur, may result from smaller doses than in younger patients. One must be particularly careful in prescribing drugs that are manufactured in two sizes so that the patient will understand this sensitivity, and in the refilling of his prescription, under no circumstances substitute the larger size for the smaller one.

Case reports

1. A 67-year-old woman was getting along rather well during medication with 2 mg. of Artane in the morning, 2 mg. at noon, and 1 mg. at supper. Through a misunderstanding in the refilling of her prescription, 5-mg. sized tablets were received by the patient. Her daily intake then became 12½ mg. as against the previous total of 5 mg. per day. There was an immediate result and the patient became psychotic at midnight. She ran screaming into the street, in her nightgown, claiming that her house was on fire. She was taken to the Police Station and would have been temporarily committed to a psychiatric hospital except for the fact that a relative managed to get in contact with the physician and the situation was rectified.

2. A 73-year-old man with Parkinson's disease in addition to considerable hypertension was treated by his family physician with 0.6 mg. of hyoscine and 50 mg. of Benadryl three times a day. On the third day the patient had hallucinations and there was complete retention of urine. He was admitted to the local hospital for bladder surgery. It was only because of the mental condition that the surgeon called me as a consultant, thus understanding the true nature of the situation.

In general, the toxic manifestations subside rapidly when the drugs are stopped

or drastically reduced. In nearly every instance complications such as those just mentioned will clear up within twenty-four to forty-eight hours.

GENERAL MEASURES

It is routine practice in this hospital to weigh every patient at each visit, as well as record the pulse and blood pressure. The development of hypertension is an important warning of deterioration and usually goes with a poor prognosis. The beginning of weight loss in any Parkinson patient is a serious threat to well-being and must be watched most carefully. After a reasonable time with in-between feedings, special diets, vitamin supplements and other measures, if the patient continues to lose weight he must be admitted to the hospital for careful medical study, because there may be a concurrent malignant condition.

In a few selected geriatric patients with uncontrolled weight loss, a high-normal thyroidal radioiodine uptake and a high serum protein-bound iodine level, we have suppressed the metabolism with radioactive iodine (2). This has been successful in restoring the body weight and making the patients more comfortable, although it is has not affected the Parkinson's disease itself. Oddly enough, a few patients as they have come into the eighth decade, following their retirement and release from the struggle for existence, have drifted into a natural lowering of their metabolic level and improvement of their Parkinson symptoms and body weight, without artificial measures.

In the geriatric group the complication of osteoporosis is observed more frequently and must be considered. Patients who are disabled by parkinsonism and who obtain some benefits from physiotherapy or the use of drugs may in their exuberance slip on the bathroom floor and fracture a hip. This would not occur in younger individuals, and it always sets back a Parkinson patient to a rather severe degree. In the elderly group, physiotherapy for Parkinson's disease has far less importance than in the younger group. It is more difficult for the patients to get to the physiotherapist and the passive manipulations are less well tolerated. Fatigue and unwillingness to meet these sessions are more common. On the other hand, an intelligent modern use of physiotherapeutic measures can greatly help the elderly patient with this disorder, if the foregoing warning is kept in mind.

PSYCHOTHERAPY

The usual type of psychotherapy that benefits patients with Parkinson's disease in the geriatric group includes reassurance, a full explanation of the relationship of the psychiatric symptoms and the parkinsonism, and the strong supportive therapy that a good family physician is usually very adept at prescribing. Before discussing this further it is well to mention that there are four types of psychiatric syndromes associated with Parkinson's disease:

1. A psychiatric condition which existed before the parkinsonism developed. Patients who are emotionally vulnerable may have neuroses since their early years; the parkinsonism develops later. This is also true with patients who are subject to periodic depressions before the onset of parkinsonism.

2. A depression that is the reaction of the patient to the presence of a chronic disabling disease. This is very common in the geriatric group when an otherwise active person becomes disabled and severely handicapped by the insidious onset of a chronic disorder. A severe depression may seriously complicate the treatment of this disorder.

3. A psychiatric disorder induced by sensitivity to, or an excess of the belladonna drugs. It usually manifests itself at night with hallucinations or confusion and during the day with paranoid symptoms. This type of mental disturbance promptly subsides when the medicine is withdrawn.

4. Rather bizarre and peculiar mental symptoms occur in a few patients with Parkinson's disease. These are very transient in nature and appear to be associated with the disease itself. For example, a patient may have crises of crying with severe and hopeless depression coming on paroxysmally at a time when there is a marked increase in tremor and rigidity.

One must also consider that the personality (3) of the patient with Parkinson's disease makes a difference as to how he will react towards his disorder. We have found that the placid, adaptable, well-integrated, easy-going personality that is usually free from worry (which we call Type A) accepts his parkinsonism without too much trouble. The dependent, vulnerable, sensitive, worrisome personality (Type B), on the other hand, has great difficulty in adjusting to the presence of a chronic disorder. Type B patients are frequently people who are excessively neat and meticulous, and easily upset by minor difficulties in their environment. The third personality type is the striving, restless, dynamic person who has made an outstanding success of life by his excessive drive and activity. Such personalities (Type C), when faced with chronic illness, have the most extreme difficulty in adjusting to it.

It is obvious that the kind of psychotherapy that is effective in the geriatric group depends on the patient's personality and the type of symptoms which he presents. There is some difference of opinion as to whether a patient with Parkinson's disease should be told the nature and name of the disorder from which he is suffering. In my own practice I *always* inform the patient in the quiet of the first, second or even third office visit, of the name of the disease and the nature of the disorder *after* the diagnosis has been thoroughly established. Since this disease is not going to be cured and will remain with him until he dies, which may be a matter of ten years or more, I cannot see any way to postpone the inevitable facing of the truth on the part of the patient. If the physician pretends that the patient does not have Parkinson's disease, sooner or later he will have to admit that he has not been honest. This is a very difficult blow for the average patient to accept and it would be best to avoid it. Furthermore, sooner or later most victims of this disorder find out from some lay source that they have Parkinson's disease and this is always much more difficult to accept than when it is explained in an honest, clear manner in the physician's office.

Many patients with mild forms of parkinsonism, if they find out about it immediately, assume that in a few months they will reach the level of complete invalidism and disability. It is admittedly time-consuming and requires a certain

amount of skill, tact and patience on the part of the physician to explain to the patient the truth concerning his health. It also seems almost impossible to manipulate the careful adjustment of drug therapy as well as physiotherapy and psychotherapy without taking the patient into the confidence of the physician as to why these measures are being used and at what condition they are directed.

PROGNOSIS

It is very difficult to make any accurate prognosis in one visit. A method of estimating the probable chances of a given elderly individual for either maintaining his status quo, improving, or becoming rapidly worse, is as follows: Determine the co-existing medical disability such as hypertension, arthritis, or gastro-intestinal disorder, using a 4-point scale,

0—no complication (unusual)
1—slight
2—moderate
3—severe

Use the same 4-point scale to determine the emotional or psychiatric complications and use a similar scale for slight, moderate and severe gradations of the Parkinson symptoms. If the patient is unusually sensitive to the drugs that have been previously tried, add 1; if not sensitive to the drugs, score this as zero. Add these scores up and the resulting value expressed as a percentage gives the unfavorable prognosis, or if subtracted from 100 and expressed as a percentage, gives the favorable prognosis. For example, a certain patient 64 years old has severe hypertension and some diabetes. Therefore, he has a 3 score for his medical complications. He has a mild depression and an unstable personality, so he is given a 2 for his psychiatric complication. He has moderately severe Parkinson's disease and he is sensitive to drugs. The total adds up to 8—giving him an 80 per cent chance of going downhill rapidly, or not being benefited by therapy. A positive good prognosis would be 20 per cent in this case.

Contrasted with this example is that of a 70-year-old man with normal blood pressure and no medical complications, mild sensitivity in his emotional reactions and a mild parkinsonism, with no sensitivity to drugs. He has an 80 per cent favorable prognosis that he can be helped by medicine and that the disorder will not progress further.

In general, one must wait for six months and then recheck the patient, in order to estimate the response to therapy and the rate of progression of the disease (4).

SUMMARY

In general one has to deal with the need for a less active and more restricted existence in the elderly patient with Parkinson disease who has, in addition, other medical conditions associated with advanced years. When these considerations are combined with the full awareness of the sensitivity of the elderly patient to drugs, particularly to belladonna drugs, the successful handling of such cases is not as difficult as it might seem.

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TREATMENT OF PEPTIC ULCER IN THE AGED WITH UNRESTRICTED DIET*

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Ulcer patients, especially the aged, add to their emotional insecurity in many ways and certainly there is nothing about our many types of ulcer "restriction" diets which enhances their security or their nutritional status. These patients like to eat and live as normal people. The purpose of this paper is to present a method of peptic ulcer therapy with unrestricted diet, especially significant in the field of geriatrics. Also presented is an analysis of 292 cases treated by this method. The patients were over 60, and all showed x-ray evidence of peptic ulcer. This age group was selected from a series of over 2,000 patients handled by this method (1, 2).

The physiologic basis of this procedure is the immediate administration and correct maintenance of a pharmacologically adequate antacid sedative treatment, sufficient to elevate the pH continuously, and to prevent acid peptic activity from destroying the continuously-forming fibroblasts, and thus permit granulation and epithelialization of the ulcer. The adequacy can be ascertained if the patient can eat an unlimited diet within twenty-four hours without distress. Any symptom occurring after twenty-four hours on an unlimited diet is evidence of the inadequacy of our medical program and immediately necessitates "heavier" treatment. An ulcer patient who cannot eat and drink everything without symptoms usually has an open active ulcer exposed to the complications of this well-known entity, and is being inadequately handled.

WHAT IS PHARMACOLOGICALLY ADEQUATE ANTACID SEDATIVE TREATMENT IN PEPTIC ULCER?

A pharmacologically adequate antacid sedative method is one which alters physiologically the abnormal acid peptic activity for a sufficiently continuous period of time to permit the constantly forming granulation tissue to remain in the floor of the peptic ulcer. If we accomplish this, there is immediate disappearance of symptoms such as pain, distention, eructation, night pain and all the signs of the hyperacid ulcer syndrome. Recent reports indicate that our newer parasympathetic-inhibiting drugs are inadequate so far as controlling this acid peptic activity is concerned; moreover they furnish the physician with a false sense of security through abolishing only the symptoms of an open active ulcer.

Drugs

The actual medications used in the method to be described are not new, but it is their method of administration that fulfills the definition of an adequate

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physiologic and clinical answer to the problem. The drugs used are aluminum hydroxide, calcium carbonate, magnesium oxide, phenobarbital, and atropine sulfate in combination tablets. Aluminum hydroxide has proved consistently, experimentally and clinically, to be an excellent destroyer of acid, but its constipating effect must be counteracted by using it in combination with magnesium oxide and calcium carbonate in such a way that the magnesium oxide effects predominate slightly. These three non-absorbable antacids are pharmacologically the most effective of all antacids, that is, per unit they will neutralize more acid than all others. For general sedation there is little choice. The simplest, cheapest, least toxic and most efficient is phenobarbital. Atropine sulfate is the drug of choice for vagus sedation. During the period of its maximum effect, atropine completely abolishes the secretory response to a meal, and less than 1 per cent of patients show sufficient side effects to warrant reducing the dose. The only other adjunct in this program of therapy is the use of milk, at night. Milk dilutes and neutralizes acid, and furnishes the fat which stimulates enterogastrone formation, inhibiting both the secretion and motility of the gastro-intestinal tract for about one and a half hours.

These are the only drugs used in this method of medical management, and they are prepared in the following doses in three readily soluble tablets[1]:

Tablet No. 1

Aluminum hydroxide .65 Gm.

Tablet No. 2

Calcium carbonate .5 Gm.
Magnesium oxide .25 Gm.
Phenobarbital .016 Gm.
Atropine sulfate .0002 Gm.

Table No. 3

Calcium carbonate .65 Gm.
Phenobarbital .016 Gm.
Atropine sulfate .0002 Gm.

Certain physiologic facts must be stressed regarding the rationale of the procedure. None of the available antacids completely neutralizes gastric acidity in peptic ulcer for prolonged periods, partly because of inadequate neutralizing properties, but chiefly because of rapid emptying of the stomach (3). Therefore, adequate therapy demands and depends upon administration of pharmacologically effective antacid sedative combinations frequently and for a prolonged period. Antacids neutralize acid peptic activity for only a limited time following administration. Thus, night therapy is imperative for the control of excessive nocturnal gastric secretions. With these facts in mind, the antacids described are used in the following way:

[1] Compounded by Caldwell Bloor Company, Mansfield, Ohio.

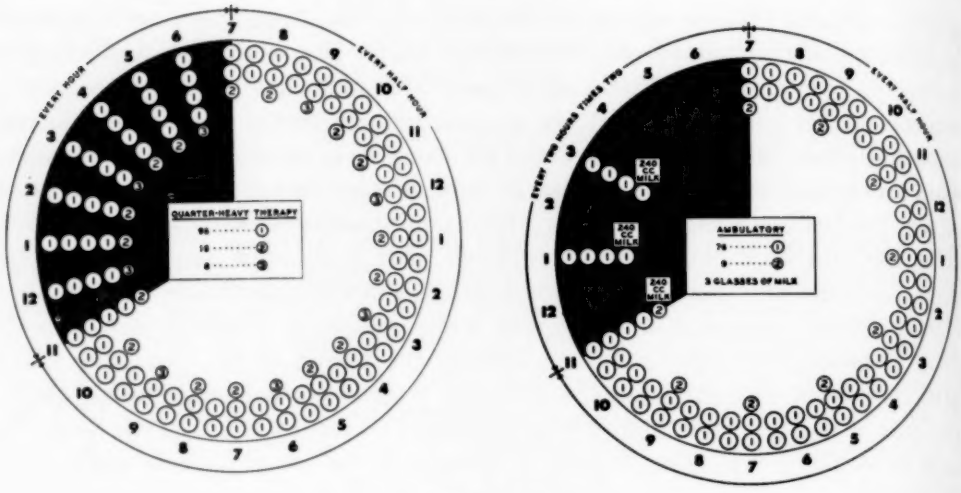

FIGURE 1

Ambulatory method

The ambulatory method (Fig. 1) is as follows:

1. Aluminum hydroxide, 20 grains (2 Tablets No. 1) every half hour for sixteen hours a day followed by aluminum hydroxide, 40 grains (4 Tablets No. 1) and 240 cc. of milk at bedtime, and in two and four hours after retiring.

2. One alkaline sedative laxative tablet (Tablet No. 2) every two hours on the odd hour during the day (nine tablets daily).

If the patient has symptoms of an unstable colon, so that Tablet No. 2 causes diarrhea, the alkaline sedative constipating Tablet No. 3 may be substituted as often as is necessary.

Twenty-four hours after initiation of this ambulatory schedule, the patient is requested to start an unrestricted diet. The term "unrestricted" is meant in its broadest sense. If the patient can eat and drink everything at the end of twenty-four hours without symptoms, the physician is assured of the adequacy of therapy and that granulation tissue has been gained.

In this 292-case series, there were 203 uncomplicated-ulcer patients, all of whom were on this ambulatory therapy regimen. Over 90 per cent had no difficulty with an unrestricted diet in twenty-four hours. Of the remaining patients, there were two groups: 1) those who responded to increased dosage of aluminum hydroxide (addition of one Tablet No. 1 per dose) on the half-hour schedule, and 2) those who were classified as medical failures.

When the symptom-free state is attained (in over 90 per cent in the first twenty-four hours), this therapy with full unrestricted diet is continued for a minimum of four and a half months. This definite duration is based on the finding that if we omitted or reduced therapy before four and half months because of the patient's feeling of well-being, there was a rise in the recurrence rate.

In this series of 292 patients over 60 years of age, 14 recurrences were observed upon follow-up investigation, the average interval being 34.5 months. More

than two-thirds of our follow-up cases had no recurrence during an average period of 41.2 months since the interruption of therapy.

HOW IS THE METHOD APPLICABLE IN HEMORRHAGE AND OBSTRUCTIVE COMPLICATIONS OF PEPTIC ULCER, AND IN SHORT-HISTORY GASTRIC ULCER?

These three problems are managed in three different ways, depending not so much on the degree of neutralization, as on the amount of sedation. We classify them as heavy, half-heavy, and quarter-heavy therapy.

Heavy therapy is used for only one day in hemorrhage, obstruction and short-history gastric ulcer. It consists of two Tablets No. 1, one Tablet No. 2 and one Tablet No. 3 every half hour for sixteen hours a day, and four Tablets No. 1, one Tablet No. 2 and one Tablet No. 3 every hour for eight hours at night (Fig. 2). This furnishes the maximum in general and vagal sedation, as well as a large amount of neutralization. *This therapy stops hemorrhage physiologically with granulation tissue instead of clot, and relieves non-stenotic obstruction immediately.*

Half-heavy therapy is used for the second day in the treatment of hemorrhage, and short-history gastric ulcer, but does not apply to the treatment of obstruction. The latter are on ambulatory therapy at the end of twenty-four hours. Half-heavy therapy consists of the same amount of aluminum hydroxide (Tablet No. 1) as in heavy therapy but the amount of alkaline sedative laxative and constipating tablets is cut in half, that is, one Tablet No. 2 every hour on the hour and one Tablet No. 3 every hour on the half hour for sixteen hours, alternating them hourly at hight.

Quarter-heavy therapy consists of the same amount of aluminum hydroxide (Tablet No. 1) as in heavy therapy but the amounts of alkaline sedative and constipating tablets are reduced to the point where they are alternated on the hour, day and night.

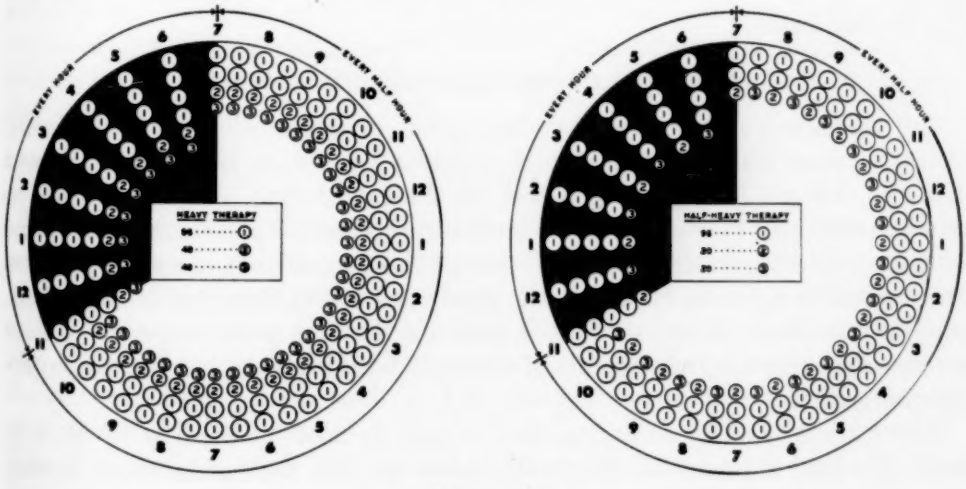

FIGURE 2

In adopting this method of treatment, we are cognizant of the objection that occurs to most observers—the toxic or side effects of the heavy doses of phenobarbital and atropine. It must be remembered that in this entity: 1) adequate sedation is definitely clinically indicated; 2) blood levels do not indicate complete absorption of the administered doses, and it is probable that in the alkaline medium all phenobarbital and atropine ingested is not absorbed; and 3) it is significantly surprising that the vast majority of these patients carry on normal activities and coherently comply with instructions, both at home and in the hospital. As the amount of atropine in heavy therapy is greater than usually used, glaucoma as a contraindication must be kept in mind. Ileus or urinary retention occurred in less than 5 per cent of our series.

TREATMENT OF HEMORRHAGE

Heavy therapy is started on admission for the first twenty-four hours, quarter-heavy for the duration of the hospital stay, and ambulatory therapy on discharge.

These patients receive soft or liquid diet the first day; unrestricted diet is started on the second day. The blood urea nitrogen (B.U.N.) level, the red blood cell count and the hemoglobin concentration are determined daily. Any evidence of shock necessitates transfusion. X-ray studies are made the first day after passage of the first light colored stool.

In this series, there were 53 cases of hemorrhage. Those in which the B.U.N. value was within normal limits were classified as mild: those with a B.U.N. level of 20–35, as severe; and those with a B.U.N. value above 35, as exsanguinating. Among the 53 cases, there were 15 mild, 21 severe, and 17 exsanguinating. There were only 6 which bled after the first twenty-four hours, that is, in 88.7 per cent the bleeding apparently stopped immediately, since there was no evidence of hemorrhage thereafter. There were 2 therapeutic failures, necessitating surgery in the first twenty-four hours. The results show that this is an excellent method for the separation of surgical from medical hemorrhage in the first twenty-four hours.

TREATMENT OF NON-STENOTIC OBSTRUCTION

The treatment of non-stenotic obstruction in peptic ulcer with its gastric retention, anorexia, pain, nausea and vomiting has always been recognized as a critically difficult emergency problem, to the extent that many physicians regard the majority of these cases as medically irreparable mechanical conditions necessitating surgery. It is true, non-stenotic obstruction is a serious problem. These patients are sick. However, the good results with this method of therapy, especially in these obstructive cases, indicate that the great majority of these patients are medically salvageable, if the problem is attacked in a logical physiologic manner (4).

Heavy therapy, after emptying the stomach, is used for the first twenty-four hours. No food is permitted by mouth. After the first day, ambulatory therapy with unrestricted diet is started.

Among the patients above 60 years of age, there were 36 obstructions; all

but 6 responding to heavy therapy. Thirty of these patients were able to eat unrestricted diets in twenty-four hours, completely relieved of obstructive signs. The 6 failures necessitated gastrectomy, because pancreatic penetration prevented the retention of fibroblasts in the ulcer floor.

SHORT-HISTORY GASTRIC ULCER

We wish to distinguish between the long history of the periodic hyperacid syndrome in gastric ulcer and the short history of the acute case. In the former, the chances of finding a malignant condition in the ulcer is about 1 per cent, that is, malignant change in a benign gastric ulcer is rare. In the latter, carcinoma may be present from the onset.

In the past we have made mistakes, both gastroscopically and roentgenologically, in the short-history cases. Now, when these patients are admitted to the hospital, heavy therapy is started for twenty-four hours, then half-heavy therapy for twenty-four hours, and then quarter-heavy therapy with unrestricted diet for fourteen days. On repetition of the x-ray examination, if the niche has disappeared, ambulatory therapy is continued for four and a half months with unrestricted diet. If the niche is much smaller, we are encouraged to continue treatment on ambulatory basis, and obtain another x-ray film in two weeks. If the niche is not altered, operation is undertaken immediately. Usually a carcinoma is found, although recently 2 ulcers which failed to respond to medical treatment were found to be benign at operation.

FOLLOW-UP

The work extends over a period of eight and a half years, and many of these patients, who were over 60, are dead of causes other than of ulcer. We know of only 1 who died as a result of ulcer—many months after discharge and in another state. There were perhaps others.

Of the 292 patients above 60 years of age, we personally have been able to get in contact with 141 of them. Of these, 101 had not had a recurrence on unrestricted diet in an average period of 41.2 months; 14 had a recurrence in an average period of 34.5 months. There were 10 recorded deaths from causes other than ulcers.

SUMMARY

1. A method of peptic ulcer therapy which includes an unrestricted diet is presented. The physiologic and pharmacologic rationale is clarified, stressing 1) the necessity of correct administration of adequate antacid sedative medication, 2) the significance of therapy during the night, and 3) the advantages and importance of an unrestricted diet. The application of this method in treating short-history gastric ulcer, and the hemorrhagic and obstructive complications of peptic ulcer is outlined.

2. An analysis is made of 292 cases of ulcer, proved by x-ray examination, in patients above 60 years of age (average 64.9 years). Of these ulcers, 249 were duodenal, 37 gastric and 6 marginal.

3. There were 53 cases of hemorrhage classified, according to blood urea nitrogen level, as mild, severe, or exsanguinating. Of these 53 cases, 47 (88.7 per cent) showed complete cessation of hemorrhage, apparently immediately, in the first twenty-four hours following initiation of this therapeutic schedule. There were 2 therapeutic failures among the cases of hemorrhage, necessitating gastrectomy. There were no deaths.

4. There were 36 cases of obstruction. Only 6 of these could not be managed medically and necessitated surgical intervention. There was 1 death.

5. There were 141 personal follow-up evaluations in the series. Among these there were 14 cases of recurrence within an average of 34.5 months after omitting therapy. However, there were 101 patients who had no recurrence within an average of 41.2 months from the time of interruption of therapy. In this over-60 age group, there were many deaths from causes other than ulcers.

6. There were 16 failures in the entire series (5.48 per cent). The mortality rate due to ulcer was 0.39 per cent (1 case).

CONCLUSIONS

1. Adequate antacid sedative therapy permits the formation of granulation tissue in an active ulcer within the first twenty-four hours. This adequacy can be ascertained if the patient can eat an unrestricted diet beginning twenty-four hours after the initiation of therapy.

2. Maintenance of this antacid sedative regimen must be for a period of four and a half months, in order to lessen the recurrence rate.

3. In the treatment of peptic ulcer, therapy during the night is imperative. Granulation tissue gained during the day because of adequate antacid sedative therapy can be lost at night. Thus nocturnal pain occurs in 91 per cent of all peptic ulcer patients, due to excessive interdigestive secretion and gastric retention.

4. The application of the method presented is especially significant in the treatment of hemorrhage and obstruction, providing a means of therapeutic evaluation and separation into medical and surgical cases in twenty-four hours, while lowering greatly the incidence of the so-called medical refractory cases.

5. The use of the method is a significant therapeutic aid in differentiating benign from malignant short-history gastric ulcers.

6. Serious complications, observed in more than one-third of patients coming to the gastroenterologist, are markedly diminished following this method of treatment.

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Abstracts of Current Literature

THE AGING POPULATION.

Benjamin, B. *Month. Bull. Min. Health* **13:** 214 (Dec.) 1954.

Population trends in England and Wales are analyzed. The percentage of individuals aged 65 years and over rose from 4.4 in 1841, and 4.7 in 1901, to 10.9 in 1951. A stable proportion will not be reached until at least another twenty years have passed. Changes at other ages also are pointed out. The so-called aging of the population arises from a decline in fertility and because more individuals are able to live longer due to better standards of living, advances in combatting disease and in rendering surgery safer, and the employment of higher standards of hygiene. Some improvement has taken place in mortality at older ages; however, the immediate outlook is not improved vitality but an acute problem from a growing volume of chronic illness. The effect of population structure on crude death rate trends is pointed out. For example, the current increase in the death rate of cancer is not due entirely to increased numbers of people surviving to ages at which the disease is most prevalent. Mortality rates corrected for the effect of the "growing up" of the population show improvement in the mortality from tuberculosis, respiratory diseases, digestive diseases, and accidents but an increase in the mortality from heart disease and cancer.

THE TREATMENT OF INCAPACITATED EUTHYROID CARDIAC PATIENTS WITH RADIOACTIVE IODINE. SUMMARY OF RESULTS IN TREATMENT OF 879 PATIENTS WITH ANGINA PECTORIS OR CONGESTIVE FAILURE IN 46 CLINICS.

Blumgart, H. L.; Freedberg, A. S., and Kurland, G. S. *Tr. A. Am. Physicians* **67:** 86, 1954.

Hypothyroidism can be induced in euthyroid patients by one or more appropriate doses of I^{131}. The results of treatment in 46 clinics of 879 patients with intractable angina pectoris or congestive heart failure are reported. Ten per cent of the patients were treated by the authors. This treatment by lowering the total metabolism of the body reduces systemic requirements to within the limit of cardiac reserve. Angina pectoris patients in whom the disease is stationary or only slightly progressive are the most suitable; patients in whom the onset is recent should not be treated with I^{131}; neither should those in terminal phases, as several months may elapse before the hypometabolic state is attained. Patients with congestive failure should show some cardiac reserve. Patients should not be hypothyroid. Doses of 10 or 20 millicuries were given at weekly intervals for three doses and then single doses at two-month intervals until hypothyroidism became manifest. Larger doses were avoided because of the danger of hyperthyroidism. Improvement occurred within two to six months coincident with the occurrence of hypothyroidism. Patients were then given small (6–18 mg.) daily doses of thyroid to maintain the lowest metabolic rate consistent with the comfort of the patient. Among 609 patients with angina pectoris, 252 (41 per cent) were markedly improved with either no recurrence of symptoms or a marked decrease in the frequency and severity of angina pectoris despite increased activity. Two hundred and nineteen (36 per cent) had a good result with a decrease in the frequency and severity of attacks. The percentages with similar results among the 270 patients with congestive failure were 45 (17 per cent) and 121 (45 per cent), respectively.

STROKE: A NEUROLOGIC DEFICIT OF SUDDEN ONSET.

Chambers, W. R. *GP* **11:** 74 (Jan.) 1955.

"Stroke" is not one entity but consists of a large and varied group of conditions, many of them curable. According to one life insurance company's statistics, cerebrovascular accident is the fourth most frequent cause of death. Knowledge now has advanced to a

stage to warrant a thorough investigation in the case of neurologic deficit of sudden onset. This may be caused by subdural or intracerebral hematoma, brain tumor, aneurysm or angioma, embolism, thrombosis or brain abscess. Prompt action saved the lives of the patients cited with these conditions. A carotid angiogram must often be employed for distinguishing one condition from another and in some isolated instances only exploration suffices. Stellate block for cerebral infarction has been used successfully and with little danger. The result in cases of sudden neurologic deficit usually is better the sooner the diagnosis can be established and appropriate treatment instituted. The incidence of recurrence is low.

CALCIUM AND PHOSPHORUS UTILIZATION IN OLDER MEN.

Daum, K.; Tuttle, W. W.; Weber, A.; Schumacher, M. T., and Salzano, J. *J. Am. Dietet. A.* **31:** 149 (Feb.) 1955.

Calcium and phosphorus utilization values during three breakfast regimens have been presented for 7 men ranging in age from 53 to 83 years. Calcium intakes were liberal, ranging from 1.463 to 2.621 Gm. Phosphorus intakes also were very liberal, varying from 1.607 to 2.771 Gm. The data presented justify the following conclusions: Positive calcium retentions were found in all subjects during both cereal-and-milk and the "no-breakfast" periods. Two subjects showed negative calcium balance in the bacon-egg-and-milk breakfast period. The most consistent values were found with the cereal-and-milk regimen. Calcium retentions in these older men were of slightly less magnitude than those observed in a group of young men in a similar experiment. However, the differences were not statistically significant. Urinary calcium values were relatively low for the older group, but were relatively constant for each individual. Phosphorus retentions were positive in all periods except one negative balance in the bacon-egg-and-milk period and one in the cereal-and-milk period. The most consistent phosphorus retentions were in the "no-breakfast" period. On the basis of group means, the daily intakes and balances for calcium and phosphorus were not significantly different in the breakfast regimens studied. (Authors' summary and conclusions.)

THE METABOLIC CONCEPT OF GYNECOLOGICAL CARE.

Hamilton, H. G. *West. J. Surg.* **63:** 56 (Feb.) 1955.

Function of the endocrine system is primarily metabolic, and disorders of the reproductive portion of the endocrine system, such as the menopause and climacteric, are "late" manifestations of metabolic deterioration. The earliest signs of this aging process may occur anytime after the age of 18 to 25 and their detection requires careful searching history during annual examinations. Symptoms of early metabolic inefficiency in women may include the following: morning fatigue following adequate sleep, afternoon energy-sag, dry skin and scalp, generalized pruritus following bathing in cool weather, brittle fingernails, premenstrual tension, leg cramps, paresthesia and tingling in arms, intermittent edema of the extremities, pelvis, and eyelids, and slightly low blood pressure. Early signs of osteoporosis, usually evident roentgenographically during the fifth decade of life when 30 per cent of bone calcium resorption has already occurred, may be suspected in the woman of late twenties and thirties with symptoms of leg cramps, muscle spasm and vasospasms. These patients require prolonged therapy, as their metabolic deterioration represents a prolonged degenerative change. Treatment may include: a high protein diet, severe restriction of sodium until edema is controlled and then moderate restriction, ammonium chloride only until edema is controlled, and moderate endocrine therapy with thyroid, estrogen, or estrogen-androgen.

INFORMATION PLEASE: DIZZINESS IN OLDER PEOPLE.

GP **11:** 126 (Jan.) 1955.

Question: I have used Metrazol orally for dizziness in the arteriosclerotic aged with some success. What other remedies will help?

Answer: Dizziness is a common complaint in elderly people and one that is usually difficult to control. No particular medication is effective in any given individual, making it necesdary to try various drugs, in the hope that one of them will give relief. Often a medication will be helpful only for a time and then one of the other drugs can be tried. Dramamine (50 mg.) can be given every four to six hours. Bonamine, another antimotion-sickness drug, can be given once a day. The average dose is 25 mg., but two tablets (50 mg.) given in the morning may be effective during the waking hours. More recently, Thorazine has been used to control dizziness in arteriosclerotic patients. The dose in such cases will vary from 10 to 25 mg. three to four times a day. Nicotinic acid is also useful in elderly patients. As a rule, excessive flushing of the skin occurs when the usual dose of 20 mg. is prescribed. It is safer to start with 5 mg., three to four times a day, and then increase to 10 mg. if the smaller dose is ineffective. Other drugs that can be used are glyceryl trinitrate, theobromine preparations, and theophylline sodium glycinate.

THE WALLENBERG SYNDROME: A REPORT OF TWO CASES.

Lewis, G. N., and Gill, J. R. *J. Indiana M. A.* **48:** 149 (Feb.) 1955.

Two patients with the Wallenberg syndrome, the syndrome of thrombosis of the posterior inferior cerebellar artery (PICAS), are compared as to the signs, symptoms, severity, and clinical course of the disease. The onset of the syndrome is usually sudden, with vertigo and falling (without loss of consciousness), unilateral ataxia, vomiting, double vision, paresthesias, dysphagia, and dysphonia. On examination, Horner's syndrome, cerebellar signs, palatal paralysis, and loss of pain and temperature sensation on the side opposite the occlusion are found. The symptoms and signs were similar in the 2 patients, but the severity and the clinical course differed. In patient I, the onset was acute with severe symptoms, and improvement was rapid. Patient II had a more gradual onset and a prolonged recovery. The symptoms vertigo, ataxia, and headache lasted for several months in patient II, but in patient I they subsided within twelve days. Patient I returned to work sooner than did patient II. The prognosis of patients with PICA syndrome is relatively good. The patient's life is in no immediate danger, and with further observation partial or complete recovery of function can be predicted.

TRANSFERENCE IN GERONTOLOGIC GROUP PSYCHOTHERAPY: STUDIES IN GERONTOLOGIC HUMAN RELATIONS. IV.

Lindon, M. E. *Internat. J. Group Psychotherapy* **5:** 61 (Jan.) 1955; Abs., *Digest Neurol. & Psychiat.* **23:** 80 (Feb.) 1955.

The therapist attempting psychotherapy with the aged would be aided by a group of criteria upon which to base his selections, since psychometrics as they now exist are not reliable when used with that group. The writer here discusses transferences as probably the most useful tools in psychodiagnostics and prognostics of the aged. Despite the psychophysiologic decrements of aging, certain affectional attitudes are offered by the late mature and emotionally disturbed patients that can be used psychotherapeutically. These are termed *acceptance recognition* (A-R) and *actual transference*. A-R is not transference. It refers to the natural human tendency to accept and to respond favorably to an ego-syntonic stimulus as well as to strive to reject anything ego-alien. Three types of actual transference exist. *Neurotic transference is* personality specific. *Recession transference* occurs concomitantly with physiologic regression. *Sociologic transference* refers to the feelings the aged as a quasi-minority group have toward the outside culture that rejects them and the manner in which they transfer these counter-attitudes to any culture representative. Two classes of emotional disturbances in the very aged are seen: the biphysiologic, dementing type, and the nondementing psychoses and neuroses. There is much overlapping and they are not always distinguishable from one another. The person who has a senile psychosis probably has a high degree of narcissistic organization with profound masochistic complexities.

The transference relationships of the aged are determined by restitutive phenomena which are in turn determined by mechanisms utilized to manage masochism, recessive feelings, and counterreactions to the elder-discarding trends of culture. Some of the actual transferences isolated among senile and senile psychotic patients in group therapy include: 1) The Predominantly Positive Transferences: clinging, aggrandizing, sycophantic, loving, and euphoric (manic, quiet and/or silly); 2) the Predominantly Negative Transferences: pseudo-rejecting, shifting, and hostile (embittered, depressed and hypochondriacal); 3) Unclassified Transferences: fleeting, perplexed (nonremitting and remitting), and indifferent. Speculations regarding their psychodynamisms are briefly discussed. The prognosis for each is mentioned, based upon the writer's experience of four years of group psychotherapy with institutionalized "seniles."

PHYSIOLOGIC CONTROL OF CERTAIN RETINOPATHIES.
Loewe, W. R. *Eye, Ear, Nose & Throat Monthly* **34:** 108 (Feb.) 1955.

The effect of combined therapy with lipotropic factors (Methischol) and citrus bio-flavonoids (C.V.P.) was investigated in 50 patients with retinopathies of various types, 25 patients with vitreous opacities, 20 patients with glaucoma, and 1 patient with optic atrophy. The rationale for this therapy is discussed in relation to reports in the literature indicating that altered fat metabolism is important in the pathogenesis of diabetic retinopathy and to reports suggesting that the weakening in the resistance of the capillary wall which is responsible for ocular capillary hemorrhage can be counteracted by therapy with flavonoid substances. The daily dosage of Methischol was 6 capsules, which provided 1.66 Gm. of choline dihydrogen citrate, 0.66 Gm. of methionine, 0.5 Gm. of inositol, 12 mcg. of vitamin B_{12}, and 0.52 Gm. of desiccated liver—liver concentrate. The daily dosage of 6 capsules of C.V.P. provided 600 mg. of bio-flavonoid complex and 600 mg. of ascorbic acid. In most of the 50 patients with diabetic or hypertensive retinopathy, the hemorrhages were promptly controlled and rapidly absorbed. The best results were obtained in the patients with diabetic retinitis. The course of glaucoma was not affected by the combination therapy. The patient with optic atrophy showed no improvement. In the 25 patients with vitreous opacities, complete, or almost complete, recovery resulted from the combination therapy. Bio-flavonoid therapy proved especially beneficial in the patients who underwent surgical procedures. Bleeding was prevented or greatly reduced. The effect of the combination therapy with lipotropic factors and citrus bio-flavonoids upon ocular vascular deterioration is illustrated by 8 case histories of patients from 51 to 79 years of age.

THE HEMORRHAGIC STATES. 1. THE THROMBOCYTOPENIC DISORDERS.
McBroom, R. E. *J. Michigan M. Soc.* **54:** 57 (Jan.) 1955.

This paper 1) presents an organized diagnostic approach to those hemorrhagic disorders that result from a deficiency of platelets in the circulating blood, 2) discusses some of the unusual and difficult diagnostic problems that may be encountered in the better known conditions, and 3) describes several recently recognized entities such as idiopathic megakaryocyte defect and "immuno-thrombocytopenia." A prompt and accurate diagnosis is indicated in every case of hemorrhagic disease. Since platelets are indispensable to normal clotting, the first step in diagnosis of any case of bleeding suspected of being due to the hemorrhagic diathesis is to determine if a clinically significant thrombocytopenia exists. The thrombocytopenic diseases classified according to mechanism of production are: 1) disorders involving the bone marrow—panmarrow hypoplasia—aplasia; foreign cell invasion; myelofibrosis—myelosclerosis; selective megakaryocyte damage; idiopathic megakaryocyte defect; idiopathic erythroid hyperplasia (acute erythremic myelosis—Di Guglielmo); deficiency diseases—nutritional states, 2) disorders involving the spleen—primary hypersplenism; secondary hypersplenism, 3) thrombocytopenia due to circulating platelet agglutinins (immuno-thrombocytopenia), 4) allergic thrombocytopenia—food allergy;

drug allergy, and 5) thrombocytopenia of undetermined pathogenesis—thrombotic thrombocytopenia; hemangioma in infants. The important clinical and laboratory features of hypoplastic and aplastic anemia, besides the hypoplasia or aplasia, are: no weight loss and no anorexia; normal BMR; usually no lymphadenopathy; no splenomegaly; granulopenic leukopenia (no myelocytes); thrombocytopenia (platelets normal); normochromic, normocytic anemia unless hemorrhage has occurred (no normoblasts); reticulocytes usually decreased; red cell fragility normal; normal sedimentation rate; and high level of plasma iron (non-utilization). The diagnosis may be established if these criteria are fulfilled and there is no history of toxic, physical, chemical, or drug factors or evidence of any underlying disease process to which marrow hypoplasia may be a sequela. The features and essential diagnostic criteria of the myelophthisic state, besides foreign-cell infiltration in the marrow, are: progressive weight loss; elevated BMR but normal iodine metabolism; possible deep bone pain due to primary or metastatic skeletal lesions; bone erosion (x-ray); Bence-Jones protein in urine, plasma, or both; granulopenic leukopenia (myelocytes present); anemia, often macrocytic and resembling pernicious anemia but may be hypochromic if there is hemorrhage (normoblasts are usually present, and polychromasia and stippling are frequent); reticulocytosis is common; thrombocytopenia (atypical platelets or megakaryocyte fragments, or both, suggest a bone marrow disorder); red cell fragility often increased; sedimentation rate increased; and foreign cells present or absent in the blood. The criteria to be considered before diagnosing idiopathic thrombocytopenic purpura are the following: There must be 1) spontaneous purpura or free bleeding from mucous membranes, or both, 2) less than 100,000 blood platelets per cubic millimeter, 3) normal clotting time and prothrombin time, 4) anemia and leukocyte count not out of proportion to the amount of bleeding, 5) no pathologic cells in the blood or bone marrow, 6) no recent history of ingestion of drugs or occurrence of those diseases known occasionally to produce thrombocytopenia, and 7) no appreciable enlargement of the spleen or lymph nodes. Splenectomy is contraindicated in: thrombocytopenia in which repeated marrow aspirations show few or no megakaryocytes, selective megakaryocyte damage, hypoplastic or aplastic anemia, foreign-cell invasion of the bone marrow, food and drug allergy, myelofibrosis and myelosclerosis, acute idiopathic thrombocytopenic purpura in children, and thrombocytopenia following acute infections.

INCONTINENCE OF URINE IN THE AGED.

Nagley, L. *Med. Illus.* **9:** 69 (Feb.) 1955.

Incontinence in the aged patient makes both home and hospital care difficult. The most common cause of incontinence in elderly individuals, aside from frank mental deterioration, is degenerative disease of the nervous system. With overactivity of the bladder reflex mechanism, the patient experiences precipitancy of micturition; with diminution in sensation, lack of awareness of the need to micturate results. The alleviation of incontinence may sometimes be achieved, in cases in which there is no obviously removable cause, through rehabilitation of the patients and provision of special equipment. The understanding and cooperation of the nursing staff are essential. Keeping patients ambulant is important in the prevention and cure of incontinence. With strict nursing supervision, patients incontinent only at night can often be cured through restriction of fluids and being awakened at night to pass urine. Special equipment providing easy access to a bottle or commode benefits patients who cannot move easily in bed or make their wants known. Conveniently located commode chairs are necessary for patients with precipitancy of micturition. Special beds and chairs designed to prevent soiling promote the comfort of patients with intractable incontinence. Small doses of amphetamine sulphate may relieve incontinence caused by mental apathy. Much of the incontinence of urine in elderly patients can be cured when each patients is considered individually and the nursing staff realizes what to expect of, and how to apply, modern methods of rehabilitation.

ILEOCECAL VALVE PROLAPSE SIMULATING CECAL POLYP.
Perkel, L. L., and Troast, L. *Am. J. Gastroenterol.* **23:** 103 (Feb.) 1955.

Prolapse of the ileocecal valve into the cecum may, on roentgenographic examination, produce a translucent filling defect simulating that caused by a polypoid tumor of the cecum. The authors review the literature on this little known condition and report their cases. In 1,100 consecutive routine barium enema examinations, 19 cases of prolapse of the ileocecal valve were found. The 19 patients were from 21 to 83 years of age; the average age was 62. The defect was most often demonstrated with spot films using moderate pressure. In some patients, the translucent shadow observed roentgenographically was further characterized by a central slit or star. In no patient was an associated regional ileitis found, and none of the coexisting pathologic findings appeared to be related to the abnormality. Operation was performed on 3 of the patients. Prolapse of the ileocecal valve must sometimes be differentiated from tumor of the valve lips, a rare lesion; intussusception, which usually shows a cone-shaped defect with transverse markings and widened lumen; and inversion of an appendiceal stump, which is located away from the ileocecal valve. There is no indication for repair or resection of the ileocecal valve on the basis of simple hypertrophy, prolapse, or a combination of both, but surgery is mandatory when the clinical findings suggest the presence of a tumor.

ACUTE RENAL INSUFFICIENCY ASSOCIATED WITH RESPIRATORY INFECTIONS.
Parrish, A. E.; Rubenstein, N. H., and Howe, J. S. *Am. J. Med.* **18:** 237 (Feb.) 1955.

Acute renal insufficiency is infrequently associated with respiratory infections. The case reports of 3 patients with uremia caused by acute renal insufficiency associated with acute pulmonary infection are presented. The patients were males 55, 53, and 47 years of age. All had become ill, with symptoms of respiratory infection, two to five weeks before hospitalization. All 3 patients had consumed considerable quantities of alcohol during their illness and were dehydrated on hospital admission. Two patients had bronchopneumonia; 1 patient had lobar pneumonia. The patient with lobar pneumonia died on the eleventh hospital day; the other 2 survived. Studies using inulin and sodium para-aminohippurate clearances, showed depression of all renal functions. Examination of kidney tissue (needle biopsy specimen) revealed marked tubular damage and some glomerular damage. In the 2 patients who survived, tubular function returned to normal within four to six weeks, but some impairment of glomerular function was still evident at the end of three months. The renal changes in the 3 patients were apparently related to the combination of alcoholism, pulmonary infection, and dehydration.

TUBERCULOSIS IN THE AGED.
Paulsen, G. A. *Arizona Med.* **12:** 74 (Feb.) 1955.

The problem of tuberculosis in older individuals is becoming more prominent. The increase in the number of older persons with tuberculosis reflects the increase in longevity of the general population and the more effective treatment of acute tuberculosis. The special problems encountered in caring for the aged involve administrative difficulties and limitations of therapy. The economic resources of many elderly persons are insufficient to cover hospital costs. Elderly patients adjust poorly to changes in their ritual of living, and it is difficult to teach them tuberculosis technique. Individuals who are physiologically old have poor tolerance for some types of therapy. A vigorous program is unsuitable, as is complete bed rest, which promotes dependence and decreases well-being in these patients. Air therapy and surgical collapse procedures are likely to give unsatisfactory results. The ideal treatment for older patients is hospital care with a modified form of bed rest and antibacterial

therapy. Also, the successful use of surgical resection in younger patients and the advances in surgery for the aged indicate that resectional therapy may prove to be both safe and effective in selected older patients with pulmonary tuberculosis.

CARCINOMA OF THE VULVA: NEW INCISION FOR ONE-STAGE RADICAL VULVECTOMY AND BILATERAL NODAL DISSECTION.

Pratt, J. H., and Watson, J. R. *Proc. Staff Meet, Mayo Clin.* **30:** 23 (Jan.) 1955.

A more radical approach is required in the surgical treatment of carcinoma of the vulva. A one-stage combined radical vulvectomy and bilateral block dissection of nodes is the procedure of choice. A new incision is described that permits closure with primary healing of the wound after block dissection of the vulva and the inguinal, femoral, and external iliac nodes from both groins. Points in the technic are emphasized. This incision renders accessible all lymph nodes to which the carcinoma may spread and they can be removed in a single block of tissue, with the exception of the external iliac and the obturator nodes. Because the incision allows primary closure, the length of hospitalization is decreased. Postoperative complications such as edema from lymphatic obstruction and sloughing of the edges of the incision are frequent. Early ambulation and anticoagulant therapy are used to combat pulmonary embolism, the major postoperative cause of death.

NEWER CLINICAL AND LABORATORY STUDIES IN THE AGED: V. LIPIDOGRAM BY PAPER ELECTROPHORESIS IN "NORMAL PATIENTS" 80–100 YEARS OF AGE. A PRELIMINARY REPORT.

Goldbloom, A. A. *Am. J. Digest. Dis.* **22:** 51 (Feb.) 1955.

Paper electrophoresis provides a simpler method than the ultracentrifuge for studying the distribution of protein and lipid material in the serum. The technic is described. Two groups of normal patients with average ages of 33 and 90 years, respectively, were studied electrophoretically. The protein distribution showed a lower albumin and A/G ratio and there was a higher beta globulin value in the older age group. No significant difference was found between the lipoprotein distributions in the two groups. Abnormal lipidograms showing an increase in the beta lipoprotein fraction were found in 2 patients in each group. The increased values did not occur in old-age group patients having increased Sf lipoprotein molecules and increased serum lipid partitions. No clear-cut correlation was seen between chemical serum lipid partitions, Sf-lipoprotein molecules separated by the ultracentrifuge method, and lipidograms obtained by electrophoresis. The serum lipid partitions, standard Sf-lipoprotein molecules, and atherogenic index were found to be low in normal patients aged 80 to 100 years.

STUDIES IN THE PROCESSES OF AGING: ELECTROENCEPHALOGRAPHIC FINDINGS IN 400 ELDERLY SUBJECTS.

Silverman, A. J.; Busse, E. W., and Barnes, R. H. *Electroenceph. & Clin. Neurophysiol.* **7:** 67 (Feb.) 1955.

Electroencephalograms were obtained on 400 subjects over the age of 60 as part of a project dealing with aging of the central nervous system. Examination of 100 senile patients, without evidence of gross focal neurologic disease, revealed normal records in 22 per cent and a preponderance of diffuse and mixed abnormalities. In 145 volunteers from the community without neurologic disease, a high percentage of focal disturbances was found, and a gradient of decreasing EEG abnormality of all types was noted with higher socio-economic levels. Focal disturbances alone did not seem to cause psychologic impairment. Psychologic test data correlated diffuse and mixed EEG abnormalities with the great-

est degree of psychologic deterioration. Forty-five psychiatric patients with no evidence of brain damage revealed patterns of electroencephalographic abnormalities similar to those in the community group of volunteers, 60 per cent of their records being normal. Diffuse fast-wave disturbances were relatively more frequent among the abnormalities seen. Ninety-four neurologic patients showed the expected low incidence of normal records and a heavy preponderance of focal disturbances. A gradient of decreasing normal records was noted in progressively older decades. Diffuse dysrhythmias which followed this trend were due to slow-wave disturbances. The incidence of focal records did not appear to change in succeeding decades, but a definite increase in the proportion of severe foci was noted in progressively older decades. Diffuse fast-wave disturbances were not frequent, and showed a tendency to decrease in older patients, as did the proportion of severe fast disturbances. No fast-wave abnormalities were seen in patients over the age of 79. The high incidence of foci in this series could not alone be correlated with psychologic test evidence of deterioration. When foci were associated with diffuse abnormalities, however, organic deterioration was definitely noted. Primarily left temporal foci were often clinically silent. The suggestion was made that hippocampal degenerations or beginning generalized vascular disease might be the cause. It was suggested that temporal foci could be more easily elicited using the vertex as a reference electrode, as well as keeping the ears "untied" and ungrounded. Also important was the use of the low-lying anterior temporal lead. (From authors' summary and conclusions.)

WORK AS THERAPY, WITH SPECIAL REFERENCE TO THE ELDERLY.
Wayne, G. J. *Ment. Hyg.* **39:** 79 (Jan.) 1955.

Work, a reality-oriented modification and outgrowth of play is of vital importance in maintaining the individual's psychic equilibrium in our culture. A person's choice of occupation often reflects unconscious motivations—needs for fulfillment of erotic and aggressive impulses—that operate throughout his lifetime. Retirement is appreciated by some individuals as an acceptable withdrawal from competition with younger workers. Certain individuals are able to profit from the opportunity to concentrate on some other activity. However, even well adjusted older persons find that giving up their occupation is difficult; in persons with an excessive emotional investment in their work, requirement may cause profound psychologic reactions that accentuate physical decline. Compulsory retirement is psychologically unsound, for it interferes with the individual's pattern of adjustment at a time already difficult because physical and mental powers are diminishing. Inactivity promotes senility. Psychic balance is maintained, and life is added to years, through the continuance of work and plan activities. Occupation is therapy, in the broad sense; and the growing problem of senility would be relieved if most persons continued their work. Occupational and recreational therapy in the narrow sense should be extensively used for persons in homes for the aged and for those unable to continue their work. Such therapy is most effective when based on the patient's former occupation. The type of activity should depend upon his character and needs.

THE FATE OF THE NATION'S MEDICAL LIBRARY

A matter which concerns everyone interested in medical progress and the health of the nation is now before Congress in the form of a bill to provide proper housing, appropriate administration, and adequate finances, so that the present Armed Forces Medical Library may become a National Library of Medicine.

Since its creation in 1836 by the first Surgeon General of the Army, the Armed Forces Medical Library has grown far beyond the confines of military use and has become the finest collection of medical literature in the world—a great tribute to the various Surgeons General who have been farsighted enough to foster this outstanding contribution to medicine. It is now a national institution in spirit, if not in classification, and renders invaluable service in bringing medical knowledge as quickly as possible to workers in all the health professions.

The library houses over 650,000 books. About 25,000 books and 100,000 journals and monographic pieces are received annually, requiring about a mile of linear shelf footage each year. Not only does it acquire and classify these masses of books and periodicals, but it renders highly important services to all persons, civilian as well as military, seeking information in the field of health. For instance, about 8,000 orders for photoduplications are filled monthly in the loan section. Two publications of the utmost value are the monthly Current List of Medical Literature (the only comprehensive medical index in this country which is up to date) and the annual Armed Forces Medical Library Catalog. Separate bibliographies are also published, such as the forthcoming massive one on the Chemotherapy of Cancer.

Yet this irreplaceable collection is housed in a 69-year-old building in Washington, condemned thirty years ago as unfit for library use. In 1942, to relieve overcrowding, the History of Medicine Division was moved to Cleveland; in 1952 additional Cleveland storage space had to be obtained in a warehouse. Thus, there is a constant threat of loss by fire, the occurrence of actual damage from improper storage, and a continual expenditure of money and effort in the moving of material from place to place in a desperate attempt to keep pace with the needs.

At present the library is operated under the Department of Defense. This does not seem to be a logical situation, when applied to an institution which is operated primarily for civilian purposes. Understandably, the expenses of the library cannot hope to compete with regular military defense items, and thus the needed financial aid is repeatedly denied. In view of the increasingly large amounts appropriated yearly by Congress for medical research, it would seem reasonable to appropriate the fractional amount required once in a generation for the agency which provides such fundamental material for the achievement of these objectives.

The project is backed by leading medical, dental and hospital organizations, medical researchers, physicians and health teachers all over the country.* During

* Further details may be procured from Colonel Frank B. Rogers, Director, Armed Forces Medical Library, Washington 25, D. C.

the past year several bills embodying the Hoover Commission recommendations were introduced in Congress. In the Senate the matter has been referred to the Committee on Labor and Public Welfare, of which Senator Lister Hill is the Chairman. Senators Hill and Kennedy are co-authors of a bill which was submitted to Congress in March 1956—"A bill to promote the progress of medicine and to advance the national health and welfare by creating a National Library of Medicine." It is now undergoing hearings in the Senate. The results can profoundly influence the utilization of medical literature, and thus the conduct of medical research, teaching and practice in this country.

NEWS AND NOTICES

MEDICAL LIBRARY ASSOCIATION

The Medical Library Association will hold its 55th annual meeting from June 18 to 22 at the Hotel Statler in Los Angeles, California.

The program will include a tour of the new UCLA Medical Center in addition to addresses by DR. CHARLES W. SCHILLING, *U. S. Naval Academy*, DR. W. L. HALVERSON, *Professor of Public Health, UCLA*, DR. CYRIL B. COURVILLE, *Professor of Neurology, College of Medical Evangelists*, DR. STAFFORD L. WARREN, *Dean of the UCLA Medical School* and others prominent in the field.

Further information can be obtained from Mrs. Ella Crandall, Librarian, Los Angeles County General Hospital, 1200 No. State St., Los Angeles 33, California.

PUBLIC HEALTH SERVICE RESEARCH GRANTS

The Public Health Service has announced a new procedure to expedite the processing of research grant applications for those requests which do not exceed $2000 plus indirect costs and which do not ask support for more than one year. Such applications will be accepted and processed on receipt and are not therefore subject to the usual deadlines for submission prior to review.

Council recommendations can be expected on these applications within 1–4 months from the time of submission. These procedures do not apply for requests for supplements to existing grants.

Address all applications as well as requests for forms or additional information to the Division of Research Grants, National Institutes of Health, Bethesda 14, Maryland.

UNIVERSITY OF MICHIGAN CONFERENCE ON AGING

The University of Michigan's 9th Annual Conference on Aging, to be held in *Ann Arbor, July 9–11*, will deal with the topic HEALTH FOR THE AGING—Medical and Social Services. The conference will serve the interests of the medical and the many other professions which are concerned with promoting and maintaining the health of older people.

General Meetings will deal with health subjects of interest to all professional groups. In addition, the conference will offer *Clinics* for medical, dental, and paramedical personnel, and a number of *Workshops* which will present principles and techniques for promoting the health of the aging through public health programs, institutional care, housing, social and welfare services, and the integration of health services at the community level. Special attention will be given in one of the workshops to the geriatric training of medical and other personnel.

For further information, write to Wilma Donahue, 1510 Rackham Building, Ann Arbor, Michigan.

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Fellowship in the American Geriatrics Society is open to all physicians who are members in good standing of their state or provincial medical societies and similar organizations in other countries. Fellowship dues, which include a subscription to the JOURNAL OF THE AMERICAN GERIATRICS SOCIETY, are $15.00 per year. Application blanks may be secured from the Secretary, Dr. Malford W. Thewlis, 25 Mechanic Street, Wakefield, Rhode Island.

For purposes of simplicity, it has been decided that dues of any Fellows received up to September 30 will apply to the year in which they are received and that dues of new Fellows received after that date will apply to the subsequent year.

The JOURNAL OF THE AMERICAN GERIATRICS SOCIETY is the only official publication of the Society.